PUBLISHED EVERY MONDAY

Croplife®

WEST MARKETING EDITION — With Added Regional Circulation to the West Marketing Segment

TOTAL CIRCULATION OVER 9,070 COPIES EACH WEEK
BPA Member, Business Publications Audit

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL MANUFACTURER, FORMULATOR AND DEALER

Published by The Miller Publishing Co., Minneapolis, Minn.

Vol. 6 | Publication at Minneapolis, Minn. Accepted as Controlled Circulation | MARCH 9, 1959 | Subscription Rates: $5 for 1 year, $9 for 2 years | No. 10

More Knowledge Leading to Better Control of Weeds

Greater Selectivity Of Chemicals Forecast By USDA Scientist

WASHINGTON—Greater selectivity in the chemical control of weeds, without damage to crops or lawns, is predicted by a U.S. Department of Agriculture scientist as a result of a better understanding of how plants grow and react to various compounds.

Dr. Dayton L. Klingman of USDA's Agricultural Research Service at Beltsville, Md., cites these examples of advances in developing selective weed killers based on increased knowledge of the physical and physiological response of plants to chemicals:

The herbicide 4-(2,4-DB)—chemically, 4-(2,4-dichlorophenoxy) butyric acid—kills such broadleaved weeds as pigweed, ragweed and smartweed in new plantings of alfalfa, red clover and Ladino clover, with little injury to the crop. Research has shown that

(Turn to KNOWLEDGE, page 8)

Calspray Awards Contracts for New Washington Plant

RICHMOND, CAL.—Plans for California Spray-Chemical Corp.'s multi-million dollar fertilizer plant at Kennewick, Wash., moved ahead with the recent announcement of contract awards for two major processing units.

P. S. Williams, Calspray's vice president and chief engineer, an-

(Turn to CALSPRAY, page 20)

Pesticides are Modern Tools to Improve Natural Resources, Wildlife Group Told

NEW YORK—Despite the assertions of critics who regard the use of pesticides as being contrary to the interests of conservation and public health, Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Assn., told the National Wildlife Federation meeting here Feb. 27-28 that the conservation of wildlife is being improved by pesticides.

(A reprint of Mr. Hitchner's talk appears beginning on this page.)

The wildlife group, meeting at the Sheraton-McAlpin Hotel, featured a panel discussion on "Chemical Pesticides and Conservation Problems," in which the participants were authorities representing a number of viewpoints. Dr. Charles Cottam, Welder Wildlife Foundation, was moderator of the panel.

Mr. Hitchner described pesticide chemicals as "modern tools" which he said would contribute increasingly to better hunting and fishing as well as to the improved conservation of natural resources.

The NAC official presented the case of pesticides by citing examples to support his contention that the benefits gained through the use of insecticides and herbicides greatly outweigh any alleged harm done by their use when applied carefully. He said that one new chemical has proved effective in controlling the Sea Lamprey which has caused great damage to both sports and commercial fishing in the Great Lakes.

He also asserted that the use of herbicides to improve game habitat contributes to a better food supply for ducks and other species of bird wildlife.

Herbicides were also said to be helpful in improving deer browse, and in the artificial creation of open areas which are conducive to increased propagation of rabbits, sharp-tailed grouse and other forms of small animal life.

Use of pesticides in forests, Mr. Hitchner said, not only protects and

(Turn to WILDLIFE, page 20)

Bright Prospects for Western Cotton Output Cited at Meeting

PHOENIX — The keynote speaker for the Western Cotton Production Conference March 3-4 drew an encouraging picture of the opportunities for producing cotton in the western area of the U.S.

Speaker was Dr. Richard A. Harvill, president of the University of Arizona, Tucson. The educator spoke to some 500 cotton growers, research and extension personnel, and representatives of agricultural chemical companies on "Western Cotton's Opportunities."

Dr. Harvill said that since 1945 the western cotton industry "has expanded with explosive speed so that by 1958 it produced nearly one-fourth of the nation's cotton crop. And doubtless the proportion grown in the west would be even larger were it not for restrictions imposed by acreage allotments."

Many factors contributed to the westward movement, he said. They include scientific and technological developments in breeding, fertilization, insect control, harvesting and ginning. He added that many of these advantages are associated with two major production factors: irrigated agriculture and large scale mechanized farming. Combination of such factors, Dr. Harvill stated, has resulted in the West's producing the greatest cotton yields per acre and per man-hour in the world. For example, in 1945 the average yield of upland cotton in Arizona was only 366 lb. of lint an acre, but by 1949 yields had increased to 906 lb., and the record of 1,130 lb. an acre was reached in 1956.

Zinc is increasing in importance as a plant food for cotton in certain

(Turn to COTTON, page 17)

Inside You'll Find

What's New	10
Oscar and Pat	15
Editorials	22
Meeting Memos	23
Advertisers' Index	23
Classified Ads	23

Ohio Company Installs New Mixing Facilities

TOLEDO, OHIO—Fertilizer mixing equipment with a capacity of 5 tons an hour is being installed by the Andersons, Maumee, Ohio, according to Harold Anderson, head of the firm. Cost will be about $75,000.

The plant will be completed soon, when it is expected that work on filling advance orders totaling 1,500 tons will be started, Mr. Anderson said. The fertilizer will be marketed under the Anderson name.

The plant, of a temporary nature, will be replaced next year by a permanent plant which will cost about $250,000, Mr. Anderson said.

THE CASE FOR PESTICIDES

Industry Executive Answers 'Unqualified' Critics

By LEA S. HITCHNER*, Executive Secretary
National Agricultural Chemicals Assn.

— SEE STORY ON THIS PAGE —

I greatly appreciate this opportunity to participate in the panel discussion and, as requested, to present a brief outline of how the pesticide chemical industry tests its products, cooperates with various government and private research agencies to insure the safest and most effective use, and to present some suggestions for effectively solving some of the problems which we face rather than have a continuation of the fear propaganda public discussion which is injurious to the interests of wildlife, the agricultural and forestry interests of the country and, to an extent, the pesticide industry.

First let me answer a question which was asked me as to why the members of the industry undertake pesticidal research programs. There are more than ten thousand insects of economic importance known to entomologists in the U.S. Plant diseases are even more destructive.

Weeds and other unwanted vegetation cause an annual economic loss of over $4 billion. Each year certain insects and plant diseases attack our crops, forests, our food and fiber supplies, our clothing and our homes.

For example, insects and diseases kill nine times as much timber each year as is killed by forest fires. The U.S. Department of Agriculture estimated that 80 of our most common food crops could not be produced without the use of pesticidal chemicals.

Certain insects, uncontrolled, constitute a serious menace to public health. Malaria, for instance, would still be a serious threat to the population of the U.S. had it not been possible to control the insect vectors of this scourge with pesticides. Through these means malaria has been wiped out in the U.S. and sharply reduced in the rest of the world.

Many ticks prevalent in wooded and brush areas are vectors of animal and human diseases.

(Turn to ANSWERS, page 18)

*Presented on panel, "Chemical Pesticides and Conservation Problems," National Wildlife Federation, Sheraton-McAlpin Hotel, New York City, Feb. 27, 1959.

Washington Farmers' Unfamiliar Crops Produce About $3 Million Annual Business

YAKIMA, WASH. — About 2,000 Yakima Valley farmers produce a crop that's little known—yet which yields around $3 million annually.

They are growers of alfalfa, red clover, seed grain and grass seeds. About 40% of the seed is certified, taking a high premium for its top quality.

To the Sunnyside area this means a processing industry that employs eight to 15 men, depending upon the time of the year—and it brings hundreds of growers to the city to deliver their seed—adding them to the steadily rising list of patrons of Sunnyside, trading center of the lower valley.

Key to the whole operation in the area is the Albert Dickinson Co., which cleans, processes and serves as broker. It also has receiving stations in Harrah, Walla Walla and Touchet, Wash.

About a carload of seed would handle the needs of the Yakima Valley, reports Sewell Erskine, manager.

As a result, markets have been found well away from home, and on the statistical assumption that each new dollar in town makes 14 changes before being nailed down, the $3 million industry is worth $42 million to the valley.

Washington's irrigated valleys are headed only by California in per acre volume of seed production, with an average of 420 lb. against California's 450. The prediction for this year puts them even closer together, 365 lb. for Washington against 390 lb. for California.

Primary users of valley seed are the East, Midwest and exports, with Poland showing a keen interest at present in winter hardy seed.

Washington's northern grown Ranger has been a premium alfalfa seed for many years; virtually the standard of exacting farmers. Another is coming into prominence now, Vernal, which produces seed well and which is in high demand in the northern areas because it is exceptionally winter hardy.

The industry's work problem currently is insect control. Loigas bugs, mites and aphids which are a real problem in the Southwest, and which have been found in northern Oregon and a little in the Prosser, Wash., area, have growers worried—especially if no severe cold weather comes. The spotted aphid over-winters as an adult but can be killed by a deep freeze.

With greater awareness abroad of the need for quality stock feed production on a competitive market and with continued population expansions making larger and larger feed lots essential within the country, the forecast for continued prosperity in the seed business is apparently valid. And Yakima growers, raising some of the nation's best certified seeds, are high in the economic saddle.

Maury W. White

NEW SALESMAN—Maury W. White has been named an agricultural sales representative for Florida by Nitrogen Division, Allied Chemical Corp. Mr. White joined Nitrogen Division last July and, until his recent appointment, was a sales trainee at the Division's Hopewell, Va., office. Graduating from Virginia Polytechnic Institute in 1958, he holds a B.S. degree in agricultural economics. While at V.P.I., he worked summers for the Virginia agricultural experiment station interviewing farmers in connection with various experiments.

Colorado Studying Hopper Control Plans

FT. COLLINS—Campaign plans are being drawn up for grasshopper control in 1959. Gordon Mickle, Colorado State University's extension entomologist, has predicted that the grasshopper problem would be about as severe as it was in 1958.

According to a U.S. Department of Agriculture survey last fall, about nine million acres of Colorado land are expected to be infested with grasshoppers. The total includes both cropland and rangeland.

Mr. Mickle expects little aid from the weather. The 1958-59 winter, severe as it has been, will not have much effect on grasshopper numbers.

Control problems will center largely on eastern Colorado's rangeland, although there are a few isolated infestations on the Western Slope.

Mr. Mickle said that federal and state help likely will be available for grasshopper control on rangeland. But he is less sure of a cooperative program for cropland. He said that a limited amount of federal equipment will be made available for roadside spraying—but only if there is an organized control program in the county which requests the equipment.

Because of the 1958 grasshopper control program large blocks of treated lands are still largely free of the insects, Mr. Mickle said.

Witco Chemical Co. Acquires Canadian Firm

NEW YORK—Witco Chemical Co., Inc., New York, has purchased a controlling interest in P. N. Soden & Co., Ltd., Canadian chemical distributor, according to an announcement by Max A. Minnig, president of Witco.

Mr. Minnig stated that the purchase, which amounts to 85% of Soden stock, will enable Witco to further expand its chemical sales and manufacturing activities in Canada.

P. N. Soden & Co., Ltd., has been in business since 1926. It maintains offices and warehouses in both the Montreal and Toronto areas. Its total staff of 31 includes 12 sales representatives.

No change in Soden management is contemplated. Mr. Ian G. Stewart, with the company 12 years and currently its vice president and managing director, has been elected to the Soden board of directors. Mr. Stewart owns the remaining 15% of Soden stock.

Biochemistry Meeting

MERIDEN, N.H.—The third Gordon Research Conference on biochemistry in agriculture will be held at the Kimball Union Academy here, Aug. 3-7.

The conference program will cover many phases of agriculture including fertilizers, pesticides, biochemistry of plant growth and other subjects, a spokesman said.

NEW SPRAYER USE

PHOENIX, ARIZ.—Citrus growers now can use their spray rigs for something besides controlling insects. Recent tests at the University of Arizona Citrus Experiment Station here show that zinc deficiency in citrus trees can be corrected with a foliage spray, applied before new spring growth begins, consisting of 5 lb. of zinc sulfate and 2½ lb. of lime per 100 gal. of water. This was used to thoroughly wet down trees suffering from zinc chlorosis or yellowing, characterized by mottled light green to yellow leaves and little or no new growth.

Fertilizer Dealers In South Dakota to Form Organization

BROOKINGS, S.D.—An organizational committee, composed of fertilizer dealers, distributors, manufacturers and association personnel, has drawn up a tentative constitution and objectives in preparation for organizing a fertilizer dealers organization in South Dakota.

Rodney Dodge, Brookings, temporary secretary, said the constitution will be sent to every dealer in the state to learn their attitudes about such an organization. A follow-up meeting to formalize organization has been scheduled for May 25 at Brookings, Mr. Dodge said.

Original suggestion that an organization was needed came up during the ninth annual fertilizer and soil management short course at South Dakota State College. At that time, Leo Puhr, agronomy professor, was named temporary chairman. Mr. Dodge was named temporary secretary.

Ten persons, representing all phases of the industry, met here to draw up the objectives and constitution.

Attending were Robert D. Munson, St. Paul, American Potash Institute; Edward Schumann, St. Paul, National Plant Food Institute; Clarence Schadweiler, Madison, S.D., fertilizer dealer; Wesley Martin, Brookings, S. D., Farmers Union Central Exchange; Andy Anderson, Canton, Dakota Fertilizer Co.; Michael Marcour, Sioux Falls, Summers Fertilizer Co.; Steven Jones, Brookings, S.D., Land O'Lakes Creameries, Inc.; Fred Green, Brookings, S.D., Farmers Cooperative; Mr. Puhr and Mr. Dodge.

Hooker Continues Company Divisionalization Plans

NIAGARA FALLS, N.Y.—Hooker Chemical Corp. here will continue to divisionalize by forming an autonomous eastern chemical division and by making autonomous the earlier-formed phosphorus division, placing both on the same basis as its Durez plastics division, announced Thomas E. Moffitt, president.

He also announced that effective March 12, the date of the next company directors' meeting, Thomas F. Willers and F. Leonard Bryant, vice presidents, are to be appointed general managers of the eastern chemical and phosphorus divisions, respectively.

Headquarters for the eastern division will be at Niagara Falls, with plants at Niagara, Montague, Mich., and Columbus, Miss. Phosphorus division headquarters will remain at Jeffersonville, Ind., with plants at Jeffersonville, Columbia, Tenn., Adams, Mass., and Dallas, Texas.

For the present, the company plans no change of status for its Tacoma, Wash., plant and its Canadian subsidiary, Hooker Chemicals Ltd., North Vancouver, B.C., Mr. Moffitt said.

Phosphorus Makes Profits In Lettuce, Association Says

SAN MARINO, CAL.—Phosphorus fertilization makes the difference for profitable lettuce production, according to the California Fertilizer Assn. here. Conclusive evidence of this fact has been demonstrated for several years by University of California scientists.

During a recent public field day at the University's Meloland experiment station, Dr. Oscar A. Lorenz, vice chairman of the department of vegetable crops, stressed the need for proper fertilization and demonstrated the vast difference in size between lettuce that had received adequate phosphate fertilization at planting compared with no phosphate application. This notable size differential resulted in spite of the fact that both plots had received annual applications of 120 lb. to 180 lb. of phosphoric acid an acre for the past four years.

Dr. Lorenz reported that good timing and correct amounts of fertilizer are more important in growing Imperial Valley's multi-million dollar lettuce crop than any other vegetable grown in southern California desert areas.

"It is surprising that fertilization is so important," he said, "when we consider that lettuce removes fewer nutrients from the soil than almost any other vegetable crop." He stated that an average lettuce crop removes approximately 35 lb. of nitrogen, 25 lb. of phosphoric acid and 110 lb. of potash.

"This is only about a third as many nutrients absorbed by Irish potatoes and much less than a crop of celery.

"With lettuce, the time at which nutrients are absorbed is fully as important as the amount of nutrient required. The great need for nutrients is during the head development. About 80% of the nutrients used by a plant are absorbed during the last third of the growth period."

He pointed out that in spite of this, phosphate applications must be made at planting time in order to receive maximum response. "Late applications of P_2O_5 have little or no effect."

The importance of proper nitrogen fertilization was also discussed and Dr. Lorenz said that many growers are using more of this plant food than is necessary. His studies with O. D. McCoy of the field station showed that 100 lb. nitrogen per acre is normally sufficient.

"The actual amount required obviously depends on the soil and the season of the year when the crop is grown. For a crop planted in early fall it may be harmful to use the normal amount of nitrogen since the rate of growth is speeded up so much the crop matures in hot weather and may bolt.

"On the other hand, for late October planting which grows during the cool part of the season, it is necessary to add the maximum amount of fertilizer—both nitrogen and phosphorus.

"Phosphorus is especially important in growing lettuce. Our check plots in this area where none is applied often result in complete crop failure. The best lettuce is produced here on beds that receive at least 120 lb. and preferably 180 lb. per acre. Some of these beds have received this application for six years but still show the same response which indicates it is necessary to have a plentiful supply near the seedling," he said.

The California Fertilizer Assn. reminded growers that efficient use of phosphate is essential for maximum return on their fertilizer investment. It has now been amply proven that phosphate can be more efficiently put into the crop when there is some nitrogen with it.

$8-$16 Million Loss Annually

Weed Burning Increases Smog, California Researchers Report

BERKELEY, CAL.—Burning of weeds for range improvement adds to the increasing seriousness of smog, according to two University of California researchers. The extent to which substitute means can be used to control weeds, such as through increased use of agricultural chemicals, cannot be known without further research. Research is also needed to determine effective means of reducing smog damage by chemical control or otherwise.

Dr. John Middleton, professor of plant pathology at University of California at Riverside, and Dr. E. F. Darley, chairman of air pollution research, believe that smog is costing California farmers at least eight, perhaps 16, million dollars a year.

San Joaquin Valley growers, as well as those in other areas of the state, are facing rising costs of production due to smog damage. And farmers must recognize that they are a part of the community that contributes to the total air pollution problem, the researchers pointed out. Also, air pollution control districts have been "very effective" from an agricultural point of view.

These are the opinions, based on extensive studies of the two scientists. Their $8 million loss estimate is based on visible crop injury. They point out that probably a much greater loss results from poor growth and reduced yields of many crops showing no other symptoms.

"The San Joaquin Valley is just on the threshold of becoming one of the really serious smog areas of the state," Dr. Middleton declared. "I would certainly like to see those concerned profit by the experience of other areas and take action before it is too late."

Since air is a resource that moves in established or recognized watersheds and is not a respecter of political boundaries, Dr. Middleton feels that Central Valley farmers may want to see that air pollution control is organized on a regional basis rather than a county basis. He feels that the State Department of Public Health should establish standards of air purity, but that control and enforcement of air pollution programs should be on a regional basis. He advocates voluntary cooperative action with as little legislation as possible to achieve the desired results.

"Farmers must recognize that they are a part of the community that contributes to the total air pollution problem," Dr. Middleton declared. "Fifty years ago agricultural burning did not create a problem, but today it contributes to polluted air which is already causing visible damage to crops.

"We have the same amount of air now we had 50 years ago, but with the arrival in the area of more people, more industries, more automobiles, and more of everything else, it means significantly less air for the farmer. Farming in a polluted air basin costs more money. It costs more per ton, and takes more precious water to produce crops which give lower yields and poorer quality because of air pollution. You just can't get as many bales of cotton, or alfalfa, or tons of tomatoes, peaches or grapes on the same acreage."

Smog is a statewide problem from the standpoint that it affects everyone living in California. It not only costs farmers more to grow crops in heavy smog areas, but because some crops are forced out of these areas it requires additional transportation to get the produce to market. These costs are passed on to the ultimate consumer. Therefore, everyone is affected.

First noticeable smog damage to agricultural crops developed in the Los Angeles basin in 1944, Dr. Middleton said. It became apparent in the Bay area in 1950, and around San Diego in 1953. By 1956 it was beginning to spread to the San Joaquin Valley. There is still no evidence of crop damage in the Sacramento Valley, Dr. Middleton says.

Alfalfa has been hardest hit of the field crops, to the extent, it is said, that little good alfalfa is now grown in the Los Angeles, Riverside, and San Bernardino areas. Only slight damage to alfalfa has so far been experienced in the San Joaquin Valley. Smog causes leaves of the plant to drop, leaving only the stems with a tuft of young leaves at the tip. This, of course, results in reduced nutritional value.

Spinach, cabbage, lettuce—in fact, most of the leafy vegetables and some of the root crops—are showing smog damage, and many are no longer being grown in areas of frequent smog density. The leafy vegetables raised in these areas show dead spots marked by brown blotches, destroying sales value. The growing of salad greens, spinach, and mixed lettuce greens has now largely moved from the heavier populated areas of Southern California to Monterey, Santa Barbara and Ventura counties, the scientists point out.

The fruit crops—apricots, peaches, citrus and grapes particularly—have been hard hit in portions of Southern California as well as in some of the northern counties. In fact, a new grape disease named "oxidant stipple," said to be caused by the ozone element in polluted air, now is evident in parts of Santa Clara, Alameda, Napa and Solano counties. This oxidant also damages apricots, and peaches by causing stippled leaves, leaf drop and stem damage.

Both Dr. Middleton and Dr. Darley agree that where air pollution control districts have been organized, they have been "very effective" from an agricultural point of view. "Actually," Dr. Middleton said, "damage to agricultural crops has been diminishing in the Los Angeles area, and at the same time is becoming worse in the Riverside-San Bernardino area with increasing population and industrial growth and no effective control program. It is possible, too, that weather changes may have had some influence."

Burning of any organic material contributes to air pollution, Dr. Middleton said. Burning for range improvement and weed control adds to the problem, but which of the burning operations is most important from this standpoint is not known. More research along this line is needed, he believes.

LOOK OUT,
Bo Weevil...

here comes FRONTIER BHC offering all these advantages to formulators:

LOW GAMMA (14%) BHC

For production of field strength dust or 12% dust concentrate. Factory-processed to flow freely and offer excellent grinding characteristics . . . to speed your production. Packed in 75-pound polyethylene paper bags for easy handling and storage. Warehoused at Wichita, Kansas and Macon, Georgia for fast delivery to you or convenient pickup by your own trucks.

HIGH GAMMA (36%-42%) BHC

Recommended for production of BHC wettable powders, dust concentrates, solutions and emulsions. Contract for your BHC from Frontier – and benefit from advanced quality control in one of the industry's newest plants . . . and fast, friendly Frontier service, backed by the resources of Vulcan Materials Company . . . your assurance of reliability.

FRONTIER PRODUCTS
BHC
Grain Fumigants
Chloromethanes
Muriatic Acid
Anhydrous HCl
Chlorine, Salt
Caustic Soda

PLANTS
Wichita, Kansas
Denver City, Texas
Dumas, Texas

FRONTIER CHEMICAL COMPANY DIVISION
VULCAN MATERIALS COMPANY
WICHITA 1, KANSAS, Phone WHitehall 3-3263

VULCAN MATERIALS COMPANY:
Birmingham Slag Division, Brooks Sand & Gravel Division, Chattanooga Rock Products Division, Concrete Pipe Division, Consumers Company Division, Lambert Bros. Division, Montgomery-Roquemore Division, Stockbridge Stone Division, Vulcan Detinning Division, Frontier Chemical Company Division, Tecketo Corporation, Wesco Contracting Division.

YOU WOULD EXPECT ALL

THE COUNTRY'S LARGEST AND OF PHOSPHATE PRODUCTS FOR

DĪ-MŌN

18-46-0 Granulated

A Modified Di-ammonium Phosphate

DĪMŌN is the latest addition to USPP's family of quality phosphate products— **DĪMŌN** can be used efficiently and economically in producing most high analysis formulations and is extremely suitable for ultra high analysis. **DĪMŌN** is a product of uniform particle size and guaranteed Chemical analysis—this product offers many advantages over conventional materials—lower material costs, increased production rate, a better conditioned fertilizer, reduced handling time and a broader range of formulations.

TECHNICAL ASSISTANCE—

We maintain a field staff of technical representatives, conveniently located to give immediate assistance, who are at your service and are anxious to assist you in adapting USPP's products to your particular processing for a more efficient and profitable operation–For the services of these technical representatives, contact BRADLEY & BAKER.

THREE FROM USPP!

MOST DEPENDABLE SOURCE HIGH ANALYSIS FORMULATIONS

GRANULAR TRIPLE SUPERPHOSPHATE

For Direct Soil Application

A product of uniform particle size, completely dust free, low moisture content, and highest porosity. It will not cake or lump in storage or bridge over in the hopper. Drills free to provide the desired amount of plant food through even, uniform flow and distribution.

GUARANTEED 46% APA
Available in Bags or Bulk

PHOSPHORIC ACID

Acid of highest purity to assist you in reducing formulation cost and maintaining consistent, uniform high quality in all your phosphate processing.

Manufactured to the following Specifications:

52-54% P_2O_5
Solids less than 1% by Weight
Specific Gravity: (60°F) 1.68-1.73
Available In Rubber Lined Tank Cars

For Scheduling and Requirements of USPP products, contact our–

SALES AGENTS
BRADLEY & BAKER

U.S. PHOSPHORIC PRODUCTS

TAMPA, FLORIDA
Division
TENNESSEE CORPORATION

Some Concepts of Statistical Control Techniques Simplified

By VINCENT SAUCHELLI
Chemical Technologist
National Plant Food Institute

"You mean to say that the general attitude of the thinking public in our country in the late 19th century toward business practices was deeply influenced by Darwin's theory of evolution, 'the survival of the fittest'? That the cut-throat competition associated with the first Rockefeller and Harriman and Carnegie was somehow linked with those scientific teachings?"

"Yes, incredible as it may seem, Darwin's exposition of the method of jungle warfare in nature apparently seized the imagination of people and the bolder ones applied it to business practices."

The preceding snatches of conversation were overheard recently on a visit to a local college campus. The speaker went on to show how in our day another principle from the teachings of science is being learned and applied: the lesson of symbiosis. The symbiosis concept relates to that intimate association of two unlike species for their mutual advantage, for example, the root nodular bacteria and the legume plant as the host. The close association of science and business in our day is symbiotic and is responsible for the remarkable progress currently evident in the fields of technology.

Among the many important developments and accomplishments of this symbiotic relationship, one stands out: the development of statistical quality control as an indispensable tool. The use of statistical techniques by progressive management, chemical engineers and all others responsible for making decisions is an achievement of our modern times.

The agronomist working with variations of soil, plant varieties, nutrient levels and weather; the physicist making precise measurements; the control chemist involved with variations of size, shape, density and moisture in samples and differences in glassware, balance readings and temperatures; the plant superintendent interested in efficient production, high quality and minimum unit cost of production—all these use or could use statistical techniques.

Although statistics is recognized by many leaders now as an acceptable research tool in every field of science, its proper use is far from being universal. Having had to familiarize myself with this subject of statistical control in connection with one of the important research projects sponsored by the National Plant Food Institute, I have become very enthusiastic about it. This and subsequent articles on the subject reveal my desire to share with our industry some of the things I have learned and to point out where they may be put into rewarding practices.

Let us face it: the fertilizer industry is not using this modern tool.

Why, it may be asked, is it lagging in the utilization of this powerful aid? Too much calculation? or too much mystic jargon? or the feeling it does not need it? Statisticians do use a jargon in their efforts to describe the technique and how it is applied which has discouraged many beginners.

However, the main concepts of the subject can be explained in current, jargon-free American speech with very few new words. It is the ideas, not the terms, nor even what seem formidable computations cluttered with Greek letter symbols that are the important core of the subject. The basic ideas rest upon the following concepts.

No two things are identical. Variation arises from many sources: raw materials are not uniform, equipment or steps in processing them differ; workers differ in skill, grow tired and careless; temperature and humidity conditions vary; sampling techniques and instruments vary; measuring devices of all kinds vary.

Generally, each individual item in a series of similar parts will approximate in size, weight, hardness and other physical characteristics an ideal part whose dimensions are the average dimensions of all the individual parts. It is assumed that this ideal part meets the specifications exactly. However, the statistician recognizes the possibility of variation by setting plus or minus limits, and these are known as tolerance limits for each important dimension.

Besides getting the mean or average value of a dimension with its plus and minus tolerance limit, the statistician or engineer wants to have some measure of the variation. It is a fact that the positive and negative deviations about the mean value cancel each other out, and the average deviation is always zero. Hence, this is no value for the purpose of measuring the amount of variation.

Experience has shown that the square root of the average of the deviation about the mean which has been squared—what the statistician calls the standard deviation—is the best estimate of variation. Furthermore, by squaring the item, the negative numbers are eliminated. (Squaring negative numbers results in positive values.)

From the laws of probability it is known that only 46 measurements out of 1,000 will vary from the mean by more than twice the standard deviation, and only 3 out of 1,000 by more than three times the standard deviation. This property of the standard deviation is important to the user of statistics. He uses it in getting and maintaining the quality of production, in establishing specifications and tolerance limits and in accepting testing results.

In the next article on this subject we shall discuss the Shewhart Chart and explain in more detail the implications of standard deviation.

Raymond Bag to Make Stretchable Multiwalls

MIDDLETOWN, OHIO—Raymond Bag Corp. will soon start production of multiwall bags made from a new patented stretchable paper.

J. R. Clements, president of Raymond, stated that the parent company, Albemarle Paper Manufacturing Co. of Richmond, Va., has been licensed by Clupak, Inc., of New York City, to install machinery and produce the new paper. The process will be paced in operation on machines at the Halifax Division in Roanoke Rapids, N.C.

Initial production of the new paper will be used in manufacture of multiwall bags at Raymond plants in Middletown, Ohio and Richmond, Va. The new paper provides abnormally high stretch characteristics making an extremely tough but flexible multiwall package, Mr. Clements said.

Groundbreaking Held For California Plant

FRESNO, CAL.—Ground-breaking ceremonies for the new Valley Nitrogen Producers' basic fertilizer plant were held recently at the plant site near Helm, in Fresno County. Louis A. Rozzoni, California Farm Bureau president, and a director of Valley Nitrogen, addressed the meeting. Also present were Mal Carberry, Sherman Thomas and Carl Haas, Valley Nitrogen board members. Construction work on the new plant, which will cost about $9,500,000, is now proceeding according to plan.

H. S. Beaudoin E. R. Little

Salesman, Researcher Added to Geigy Staff

ARDSLEY, N.Y.—The addition of two men to the staff was announced by Geigy Agricultural Chemicals, division of Geigy Chemical Corp.

Howard S. Beaudoin has been appointed to the firm's field research staff, assigned to the Pacific Northwest area. He will conduct field research on the company's Triazine herbicides and other products under development. He is a graduate of both Weber College and Utah State University. He was formerly with Velsicol Chemical Corp.

E. Robert Little has been named sales representative covering the central and northern California areas. Mr. Little, who will headquarter in San Francisco, is a graduate of the University of California and was formerly associated with American Potash & Chemical Corp., Olin Mathieson Chemical Corp. and the Holly Sugar Corp.

Fertilizer Placement Importance Discussed By California Expert

DAVIS, CAL. — "A plant has enough trouble getting a start in life; don't increase its problem by putting fertilizer in the wrong place at planting time," said A. J. Ohlrogge, visiting professor at the University of California, Davis, to visitors at the recent Farm Machinery Conference.

"Evidence is conclusive by now," Mr. Ohlrogge said, "that band fertilizer must be placed where plant roots can reach it, but not so close that it will inhibit germination, as it can under certain conditions.

"It's only a rule of thumb, but it's usable: place the band of fertilizer 2 in. to the side of, and 2 in. below the seed, and you shouldn't miss the mark too far."

Actually, Mr. Ohlrogge explained, the effective placement area may vary from 1 to 3 in. to the side and below the seed.

"The major point to remember," he said, "is that the fertilizer must be placed where the plant roots can reach it in their normal growth. They won't seek it out; it must be placed to intercept the roots."

It is not necessary that many roots find a toehold in the fertilizer, Mr. Ohlrogge said. In tests, researchers led a single root into an isolated fertilizer container, and found that the single root quickly developed prolific secondary roots that provided the whole plant its needed phosphate and nitrogen.

The primary nutrients, nitrogen and phosphate, must be mixed in the banded fertilizer, Mr. Ohlrogge pointed out. The root growth needed to utilize the fertilizer won't develop if the nitrogen and phosphate are banded separately.

Mr. Ohlrogge is a professor of agronomy at Purdue University. He is doing research on soil fertility at Davis under a National Science Foundation fellowship.

NAMED AGRONOMY HEAD

FORT COLLINS, COLO. — Dr. Robert S. Whitney, member of the agronomy staff at Colorado State University for 25 years, was named head of the department. He will also be the chief agronomist for the CSU experiment station.

Philip F. Stocker Heads Minnesota Fertilizer Group

ST. PAUL—About 45 persons formally organized the Minnesota Fertilizer Industry Assn. at a meeting in the new Soils Bldg., St. Paul Campus of the University of Minnesota, Feb. 26.

Officers of the new group are Philip F. Stocker, Land O'Lakes Creameries, Inc., Minneapolis, chairman; J. M. Coates, International Minerals & Chemical Corp., Mason City Iowa, vice chairman; Robert D. Munson, American Potash Institute, St. Paul, secretary, and O. J. Arlien, Minnesota Farm Bureau Service Co., St. Paul, treasurer.

Elected to the executive committee, in addition to the four officers, were Ralph Willits, Spencer Chemical Co., Minneapolis; Lester O. Peterson, Armour Fertilizer Works, Winona; Richard A. Fancher, Welcome Agricultural Chemical Co., Welcome, and Roy Howe, Howe, Inc., Minneapolis.

Ex-officio members of the executive committee are M. W. Mawhinney, Smith-Douglass Co., Inc., Albert Lea; R. E. Bergman, representing the Minnesota Feed & Fertilizer Division; and Dr. W. P. Martin, Dr. A. C. Caldwell and Dr. C. J. Overdahl, representing the Institute of Agriculture.

The group approved a constitution and by-laws which designated voting members as "registered fertilizer manufacturers, producers, suppliers or their representatives and members of the industry located or doing business in Minnesota and interested in the objectives of the association." The association also will have associate members.

Mr. Mawhinney, who was chairman of the former Minnesota Branch of the Middle West Soil Improvement Committee and who had been serving as temporary chairman of the informally organized Minnesota group, opened the meeting, and the proposed constitution and by-laws were presented by Mr. Munson.

The executive board of the association will meet at the St. Paul Campus April 1. Annual meeting of the association will be held during the soils short course in early December.

Firm to Add Two Liquid Fertilizer Tanks

SILVERTON, ORE.—The two temporary liquid fertilizer tanks installed several months ago at Valley Farmers Co-op, Silverton, Ore., will be supplanted by permanent ones, on the same site, following action by the board of directors.

The installation will increase the total capacity from 16,000 to 30,000 gal., divided into two 15,000 gal. tanks.

With grain and seed crops off an estimated 30%, volume at Valley Co-op may be down proportionately, C. M. Brownell, manager, reports. "We wouldn't be too surprised if our total volume didn't measure up to last year's $1 million record, because of the short crop situation, although it is still several months till the end of our fiscal year."

New Mexico Bill Planned To Help Potash Industry

SANTA FE, N.M.—A measure designed to ease some of the economic burden faced by New Mexico's potash industry has received a favorable "do pass" recommendation from the House Taxation & Revenue Committee.

The bill, introduced by Rep. Drew Cloud of Eddy, concerns the severance tax on minerals and sets out that the severance value of potash shall be reported at 75% of the market price on which the value is based.

Rep. Cloud estimates the measure will save the New Mexico potash industry from $150,000 to $200,000 a year in severance taxes.

Dalapon, Related Chemicals Kill Grass by Vitamin Starvation, USDA Workers Learn

WASHINGTON — Discovery that the grass killer dalapon and related chemicals kill plants through vitamin starvation, and finding out just how this is done, may lead to development of more specific and better weed killers, according to the U.S. Department of Agriculture.

Dalapon interferes with a plant's formation of pantothenic acid, B vitamin essential to growth and development of all organisms. The mechanism of dalapon's lethal action was discovered by J. L. Hilton, W. A. Gentner, USDA plant physiologists, and L. L. Jansen at the Agricultural Research Service, Agricultural Research Center, Beltsville, Md., and J. S. Ard, biochemist at the eastern utilization division, Philadelphia.

Experiments were first run on ordinary yeast in test tubes, then on barley, oats and ryegrass. The finding that dalapon caused pantothenic acid deficiency was confirmed when pantothenic acid was applied to the dalapon-treated plants and they resumed growth.

Normally, pantothenic acid is synthesized within a plant by enzymatic action on two known chemicals, pantoate and beta alanine. The plant enzyme has separate sites within its molecule for attaching onto each of these chemicals. The enzyme acts to bind the other two chemicals to itself, temporarily forming a single large compound. Then, the enzyme withdraws from the compound, leaving the pantoate and beta alanine in chemical combination as the new vitamin.

Dalapon and its related compounds also readily attach to the enzyme-site for pantoate attachment. When this happens, the enzyme cannot combine pantoate and beta alanine, and the vitamin is not synthesized.

To conduct these experiments, it was necessary to isolate the enzyme. The enzyme is so small it cannot be seen even with the aid of an electronic microscope. But its presence in the test tubes was assured by the reaction shown when dalapon was used to inhibit its action or when pantoate was applied to overcome the action of the herbicide.

One of the new chemicals that has been developed and is being laboratory-tested is a compound comprising part of the chemical structure of pantoate plus the addition of a chlorine atom. The chlorine replaces the hydroxyl groups that pantoate normally contains.

The scientists found that the new compound retained the ability to attach itself to the enzyme, but, because of the chlorine, was unable to combine with the beta alanine. Thus the changed pantoate compound produced the same lethal effect as dalapon and its derivatives.

University of Maryland Receives 3 Study Grants

COLLEGE PARK, MD. — Three grants have been made to the agronomy department of the University of Maryland, announced Dr. R. E. Wagner, head of the department.

A $2,000 grant from the American Potash Institute is for use in research work investigating the effect of fertilizer elements on yield, composition and persistence of forages and to study the inter-related soil factors influencing responses of plants to plant food elements.

Another American Potash Institute grant of $1,200 will be used for farm demonstration plots to show how different kinds and mixtures of forage plants respond to the use of potassium and certain other plant food elements.

The third grant of $750, from the National Plant Food Institute, will be used to demonstrate the response of small grains to fertilizer.

California Educator Predicts Increased Fertilizer Use in State

SAN FRANCISCO—California fertilizer usage has exceeded one million tons for three successive years, according to Dr. Daniel G. Aldrich, dean of the California College of Agriculture, adding that the outlook for further increases in fertilizer use is promising because of more intensive use of foothill and upland soils which are inherently deficient in plant food.

Dr. Aldrich was speaking on the subject, "Fertilizers and Their Use in California Agriculture," on the Soil and Water Management Program of the University of California Farm and Home Conference held on the Davis campus recently.

"Soil tests and plant analyses, within the range of accuracy, are valuable tools in determining soil and crop nutrient needs," Dr. Aldrich said. He stated that there were about 600 different fertilizer trials being conducted by the university and that many greenhouse tests of soils were being made.

"The University of California maintains soil testing laboratories on the Riverside, Berkeley and Davis campuses as a special service to farm advisors in helping them to solve specific problems," he said. "There are also many commercial laboratories in California that know local soil and crop problems and are performing valuable services to growers."

Dr. Aldrich said there were some 2½ million acres of upland soils which generally respond to fertilizer applications, particularly nitrogen and phosphate, within the 12 to 35-in. rainfall zone. This acreage is presently non-irrigated, and includes much of the state's natural grassland.

"There are about 150,000 more acres to be irrigated in Sacramento Valley and about 700,000 acres to be brought under irrigation in the Central and San Joaquin area," Dr. Aldrich forecast. He further predicted that much of this newly irrigated land would require fertilization with more intensive cropping practices.

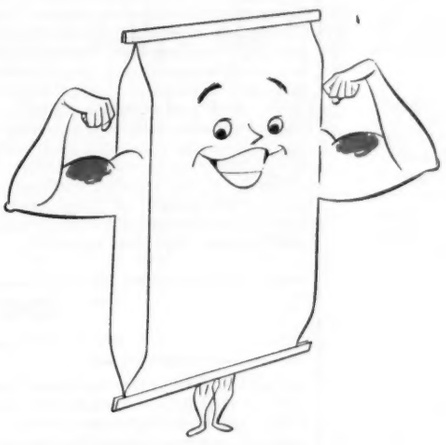
Joins Chemical Firm

WICHITA, KANSAS—Bennie Bird, manager of the agriculture department of the Wichita Chamber of Commerce, has resigned his position, effective March 15, to join Robert S. Wise Co., Inc., Wichita, as vice president and general manager.

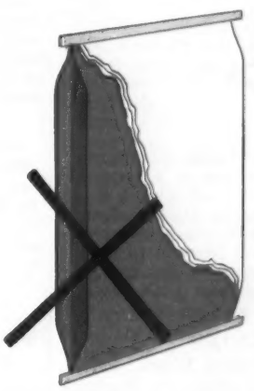
The Wise Co. formulates and manufactures agricultural chemicals and spraying equipment.

Mr. Bird was Clark County, Kansas, agriculture agent for five years before joining the Wichita Chamber staff in 1955.

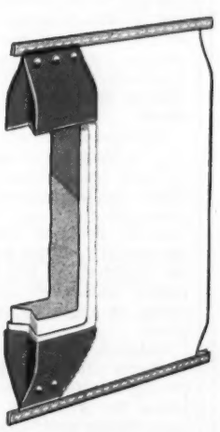
Need a little added bag muscle?
Bemis Strength-End Multiwalls give it
...*ECONOMICALLY*



Could your multiwalls use a little more muscle on jobs for which they may now be a trifle light? Are you getting breakage . . . and complaints?



There's no need to add a whole ply to your multiwalls and boost your cost appreciably. You can save money . . . and get the strength you need . . . by using job-tested Bemis Strength-End Multiwalls, with added strength top and bottom, where most sewn-bag breakage occurs.



Or maybe your problem is that you're somewhat OVERpackaged. You could eliminate a full ply and, in its place, use Strength-End protection. And save *that* way.

Bemis Strength-End Multiwalls have been successfully used in all sections of the country and under all climatic conditions.

Ask your Bemis Man for the complete story . . . and examine the bag yourself. You'll quickly see its common-sense, balanced-strength construction . . . the solution to many problems of underpackaging and overpackaging.

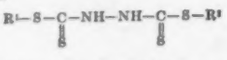
Bemis

General Offices—408 Pine Street, St. Louis 2
Sales Offices in Principal Cities

Industry Patents and Trademarks

2,874,086

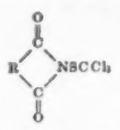
Compositions and Methods of Combating Nematodes Employing Hydrazino-Bis-(Dithiocarbonicacidesters). Patent issued Feb. 17, 1959, to Winfried Kruckenberg, Leverkusen, and Bernhard Homeyer, Koln-Stammheim, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany. A process of combating nematodes which comprises treating nematode infected soil with a composition containing as an active ingredient a hydrazino-bis-(dithiocarbonicacidester) of the formula



in which R^1 and R^2 stand for a member selected from the group consisting of lower saturated and unsaturated alkyl radicals, in an effective amount of said active ingredient from about 20 g. to about 250 g. per cubic meter of soil.

2,875,030

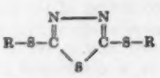
Defoliating with Compounds Containing the $NSCCl_3$ Group. Patent issued Feb. 24, 1959, to William H. Brugmann, Jr., Milltown, Howard L. Yowell, Westfield, and Allen R. Kittleson, Cranford, N.J., assignors to Esso Research and Engineering Co. A method of defoliating a cotton plant which comprises applying to said plant an aqueous emulsion of a concentrate comprising from 5 to 50 weight percent of a N-trichloromethylthioimide of a carboxylic acid having the following general formula



wherein R is an organic residue, from 40 to 90 wt. percent of a non-toxic mineral spray oil, and from 1 to 10 weight percent of an oil soluble emulsifying agent, the aforesaid concentrate constituting from 10 to 50 wt. percent of the total aqueous emulsion and providing at least 1 wt. percent of said imide in said emulsion.

2,875,031

Method of Killing Weeds. Patent issued Feb. 24, 1959, to Winfried Kruckenberg, Leverkusen-Bayerwerk, and Ludwig Eue, Koln-Mulheim, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany. A method of killing weeds which comprises treating a member selected from the group consisting of seedlings and plants with an effective amount of a compound of the general formula



wherein R stands for a member selected from the group consisting of hydrogen, ammonium, alkali metal, lower alkyl, lower alkylene, phenyl, nitro-substituted phenyl, and di-lower-alkylamino carbonyl.

2,875,118

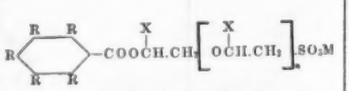
Method and Composition for the Treatment of Soil. Patent issued Feb. 24, 1959, to George O. Turner, Long Beach, Cal., assignor to the Dow Chemical Co., Midland, Mich. A method for destroying nematodes in soil and improving the ability of soil to support plant growth which comprises impregnating nematode infested soil with a composition consisting as its essential active agent of a compound selected from the group consisting of 1-chloro-2-iodo-ethane, 1-chloro-3-iodo-propane and 1-chloro-4-iodo-butane.

2,875,127

Fumigation with Sulfuryl Fluoride. Patent issued Feb. 24, 1959, to the Dow Chemical Co., Midland, Mich. A method for controlling insects, molds and nematodes which includes the step of exposing matter infested with these organisms to the vapors of sulfuryl fluoride, the exposure being carried out in an enclosed space and with an amount of sulfuryl fluoride sufficient to provide a concentration of at least 0.1 lb. per 100 cu. ft. of enclosed space.

2,875,122

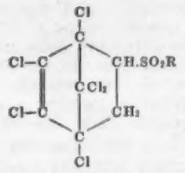
Fungicide. Patent issued Feb. 24, 1959, to Milton Kosmin, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. A fungicidal composition comprising an inert carrier, and as the essential active ingredient a sulfo ester of the formula



where R is selected from the class consisting of hydrogen, halogen and nitro radicals, X is selected from the class consisting of hydrogen and the methyl radical, n is a number of from 0 to 14, and M is a water-solubilizing cation providing a water soluble salt.

2,875,123

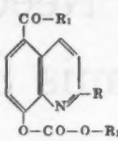
Hexachlorobicycloheptene Sulfonic Acids and Derivatives as Insecticides. Patent issued Feb. 24, 1959, to Van R. Gaertner and Dexter B. Sharp, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis. A compound of the formula



in which R is selected from the class consisting of halogen, $—NH_3$, —OH, and OM where M is alkali metal. Sodium 1,2,3,4,7,7-hexachlorobicyclo [2,2,1]-2-heptene-6-sulfonate.

2,875,126

New Esters of 5-Acyl-8-Hydroxyquinolines and Their Use for the Control of Fungi. Patent issued Feb. 24, 1959, to Ernst Hodel and Hans Gysin, Basel, Switzerland, assignors to J. R. Geigy, A.-G, Basel, Switzerland. An ester of a 5-acyl-8-hydroxyquinoline corresponding to the formula



wherein R represents a member selected from the group consisting of hydrogen and methyl, R_1 represents a member selected from the group consisting of lower alkyl, lower halogenalkyl, phenyl and halogenphenyl, and R_2 represents a member selected from the group consisting of alkyl, halogenalkyl, alkoxyalkyl, aralkyloxyalkyl, arylmercaptoalkyl, aryloxyalkyl, alkenyl, cycloalkyl, tetrahydrofurfuryl, aryl and aralkyl radicals. A fungicidal composition comprising as active ingredient an ester of a 5-acyl-8-hydroxyquinoline as claimed in claim 1, in an amount sufficient to inhibit the growth of fungi, and an inert solid powder as a carrier and a wetting and dispersing agent.

Sherman Bond

CCC APPOINTMENT—The Calcium Carbonate Co. of Quincy, Ill., has announced the appointment of Sherman Bond as technical director of the company. Mr. Bond will work with customers and research organizations on technical problems involving calcium carbonate and trace mineral premixes—the two products produced by the Calcium Carbonate Co. Mr. Bond was most recently manager of the Farm Laboratory Division of the Albert Dickinson Co., Chicago. Before that, he was laboratory director of the Kalo Inoculant Co., Quincy, Ill. He is a graduate of the University of Wisconsin.

Bangor & Aroostook to Up Free Unloading Time

BANGOR, MAINE — The Bangor and Aroostook Railroad Co. has announced that it has filed independent action notice to be allowed to furnish four days free time on fertilizer cars for receivers from Sherman north in Aroostook County. Railroad officials said the tariff presently in effect provides for only two days free time to unload cars.

KNOWLEDGE

(Continued from page 1)

the weeds change this compound into 2,4-D, a well-known broadleaved weed killer. The crop plants do not have an efficient enzyme system for converting the chemical into 2,4-D and so are not injured.

An opposite process, but with the same end effect, takes place in the use of simazin — 2-chloro-4,6-bis (ethylamino-s-triazine)—in the control of weeds in corn. Applied to the soil before the corn is up, the chemical is absorbed by both corn and weeds. But corn has an enzyme for making the toxic chemical non-toxic. In weeds, simazin blocks the production of carbohydrates, causing their death.

Physical selectivity makes neburon — 1-n-butyl-3-(3,4-dichlorophenyl)-1-methylurea — effective in controlling chickweed in bluegrass, Dr. Klingman says. Having low water solubility, neburon remains concentrated near the surface of the soil where it can be absorbed by the roots of germinating chickweed, above and out of reach of roots of established bluegrass.

Dalapon—2,2-dichloropropionic acid —affects certain grassy weeds by inducing a vitamin deficiency. It prevents the synthesis of the vitamin pantothenic acid (one of the B-complex group). Still mysteries are why dalapon can be used to kill grasses in such crops as flax and birdsfoot trefoil without harming them; why it kills one legume, lespedeza, without harm to another, birdsfoot trefoil. When science answers these questions further advances in selective weed control can be expected, Dr. Klingman says.

The same is true of other newer chemicals, about which even less is known. The chemical 2,3,6-TBA—2,3,6-trichlorobenzoic acid—shows promise in the control of red sorrel and wild garlic in lawns and pastures. A related compound, 2,3,6-trichlorophenylacetic acid, in preliminary studies, shows promise in the control of crabgrass in lawns. It may selectively remove quackgrass from bluegrass. At this time, these actions cannot be explained.

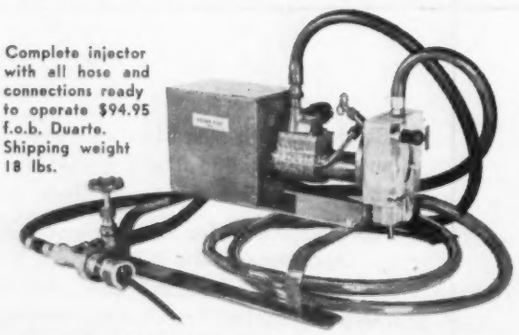
In these instances, Dr. Klingman says, research progress is made mainly by observing the effects of the chemicals on different kinds of plants.

The commonplace 2,4-D is a classic example of a herbicide that has advanced to a place of great importance in agriculture without scientists having an intimate knowledge of how it kills.

We know, Dr. Klingman says, that 2,4-D readily destroys such broadleaved weeds as dandelion, plantain, ragweed and sagebrush. We also know that it is not so effective against other broadleaved weeds such as poison ivy, briars, and other brush species. On the other hand, 2,4,5-T, a related compound, is more effective than 2,4-D against these latter weeds, and silvex, another related compound, is more effective than 2,4,5-T against chickweed, white clover, and some species of oak, as well as some of the weeds readily killed by 2,4-D.

FERTILIZER INJECTOR

Complete injector with all hose and connections ready to operate $94.95 f.o.b. Duarte. Shipping weight 18 lbs.



The injection of Liquid Fertilizer in sprinkler irrigation systems is made easy with the Arcadia Injector. Only one ¾" pipe opening is needed to connect the injector. Irrigation water pressure operates the system 35 to 150 P.S.I. recommended. Fertilizer capacity 1 to 45 gals. per hour. Corrosive material has no effect on the working parts of the injector.

Arcadia Pump
MANUFACTURING COMPANY
2142 CENTRAL AVE. DUARTE, CALIFORNIA

Special Merchandising Section

Better Selling

Marketing News and Features

MESA FEED & SUPPLY in Raton, N.M., features a variety of customers, from farmers to race track followers, and has built its business around its diversified clientele. For example, everything from bridles and harnesses to nursery plants and fertilizer can be purchased at the store.

Western Firm Features Varied Clientele, Lines

The Mesa Feed & Supply of Raton, N.M., caters to all segments of people in this mountainous section of northern New Mexico—farmers, ranchers, city home owners, race track followers, industrial accounts and even tourists passing through.

"One man's dollar is as good as another's," said youthful owner Tom Owens, "and we're always looking for more customers."

Much of the business has been the result of having the items for sale and then advertising them. But Mr. Owens has promoted part of it. His interest in horse racing brought him in contact with horse owners at the nearby race track. Before long he was selling feed and hay, bridles, horse shoes and other equine supplies.

"We're probably selling more products pertaining to horses than any store in this area," said C. R. Tanner, the firm's landscape and garden specialist.

The Mesa Feed & Supply was once called Mesa Feed & Seed, but in the gradual changeover to a general farm store, the new name seemed more appropriate.

After he bought the store from his former boss a few years ago, he saw a need for a small nursery. He built a lath house 20 by 70 ft. in size. He has a steady sale of flowers, shrubs and trees. Some of the potted plants are grown here during the warm months.

Mr. Owens has spent considerable time studying customer reactions, and has experimented with store displays. He finally moved the cash register from the front to the rear of the store. Customers now see the saddles and bridle display when they walk into the front door. Then they notice garden tools, pet supplies, and other products.

Perhaps the garden and lawn department has grown faster than any others. Mr. Owens has a 100-gal. tank sprayer mounted on a truck,

(Turn to **CLIENTELE**, page 13)

Local News Can Help Build Business: Do You Get a Share of the Spotlight?

By **PAUL LOCKWOOD**
Croplife Special Correspondent

Are you getting all the local publicity you need?

Is your name and your farm supply business mentioned in the local news every time you do something newsworthy?

Chances are good that your answers will be "NO" to both of these questions. Most dealers do not realize how many opportunities for good local publicity they have during a year.

You make news—get your share of local publicity!

Here is a check list of newsworthy items that can give you and your business legitimate publicity:

Personal Publicity—Names make news. Your name, as one of the leading merchants in your community, is newsworthy. You and your family do things that are of interest to others and will give you good publicity for your farm implement business. Consider these news items:

- ....When there is a birth in your family.
- ....When there is a marriage in your family.
- ....When your wife is elected to some office—church, club, or school.
- ....When you and your wife entertain friends in your home.
- ....When former residents of your community return for a visit with you and your family.
- ....When you and your family take a vacation trip—before you go and after you return.
- ....When you have a special wedding anniversary—25th or 50th.
- ....When your children leave town to attend college.
- ....When your children receive any special recognition at college—sports, drama, music, scholastic, etc.
- ....When your children return home from school for a holiday vacation.

Employee Publicity—Your area of publicity opportunities is multiplied by the number of employees you have in your firm. All of the items listed for your personal publicity can be used when they apply to your employees.

In addition, there are many newsworthy employee activities that can give your business valuable publicity. For instance:

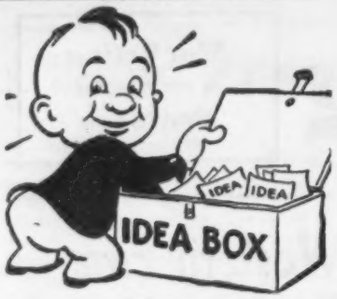
- ....When you hire a new employee, a news release will introduce him to the community and make him more loyal to you.
- ....When one of your employees is promoted in your business.
- ....When some of your employees engage in some sports event—baseball team or bowling team.
- ....When there is some employee group entertainment — picnic, dance, or dinner.
- ....When you have a sales contest for your salesmen.
- ....When you set up some new type of compensation plan for your employees—bonus, profit sharing, retirement, etc.
- ....When your employees participate in some type of training program.
- ....When your employees attend any type of industry business meeting.
- ....When one of your employees receives personal recognition

(Turn to **LOCAL NEWS**, page 14)

DEALER'S PUBLICITY CHECK LIST

- √ Personal Publicity
- √ Employee Publicity
- √ Management Publicity
- √ Industry Recognition
- √ Civic Activity

EXTRA PROFIT earned by efficiency is shown here by Glenn Smith, right, Medina, Ohio, and Ronald Burton, left, Spencer, Ohio. They were among 35 boys honored in Kansas City and Atlanta recently as National Winners in Spencer Chemical Company's Efficient Corn Growing Contest. The boys are shown with their vocational agriculture instructor, O. C. Duke. (See story on PAGE 14)



What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 6881—Brush Control Pellets

Chemical control of woody brush is offered in a pelleted formulation of fenuron, one of the substituted-urea herbicides introduced by E. I. du Pont de Nemours & Co. Called "Dybar" fenuron weed and brush killer, the pellets are scattered over brush-infested areas and give positive control with one treatment, the company said. Being nonvolatile, the pellets can be used near sensitive crops, and are noncorrosive, nonflammable and present no toxicity hazard to people or animals when used as directed, company literature claimed. The pellets are cylindrical in form, ⅛ in. long, can be scattered by hand, applied with a tablespoon at the base of individual stems or clusters, applied with mechanical broadcaster or spread by airplane. Check No. 6881 and mail for details.

No. 6882—Fertilizer Spreaders

The Ezee-Flow division of Avco Distributing Corp. announced the availability of its 1959 line of fertilizer spreaders. Spreader models 120D (illustrated), 100D and 88D, of 12 ft., 10 ft. and 8 ft. widths, feature a patented removable cam agitator that can be lifted out of the hopper

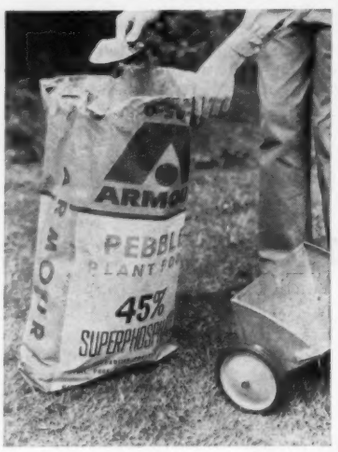
for easy cleaning, the company said. The cam agitator grinds, mixes, levels and forces fertilizer out port openings through positive camming action, the company said. The agitators are case-hardened to crush the hardest fertilizer lumps. Complete product and soil test kit information can be obtained by checking No. 6882 on the coupon and mailing.

No. 7389—Car Shaker Data Sheet

A data sheet which presents revisions on Syntron's recently introduced unbalanced-motor vibrating car shaker is available from Syntron Co. The illustrated sheet gives complete descriptions, electrical and mechanical data and specifications on this unit. The car shaker is designed to facilitate emptying of railroad hopper cars without damaging the cars. For a copy of the data sheet check No. 7389 on the coupon and mail to this publication.

No. 6879—Polyethylene Coated Bags

Bags with a coating of polyethylene to keep superphosphates dry during shipping and storage have been announced by Union Carbide Plastics Co. and Kraft Paper Bag Corp. Because superphosphate has a tendency to dry out in plain bags, the firms developed the polyethylene



coating to prevent it. The bags will not split at creases or accept moisture, literature explained. It was noted that the multi-wall bags made with polyethylene coated kraft paper are approximately 40% lighter than most conventional paper bags. Details can be obtained by checking No. 6879 on the coupon and mailing to this publication.

No. 6871—Polymer Tank Linings

Wendnagel & Co., Inc., announces the introduction of a wood tank lining made of various polymers. The linings are heat sealed into a bag liner made to fit the inside of the tank. They can be furnished for round or rectangular tanks, new or already in use, the company says.

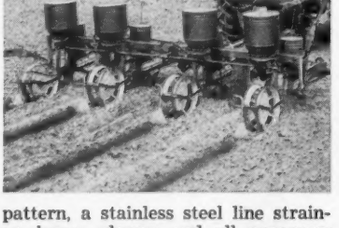
According to company literature, fittings are easily connected to the tank with the liner in place. In some cases it is possible to use plain steel or galvanized fittings with a sleeve made of the tank lining running through the fittings and ending with a flange for outside connection. A handbook containing data can be obtained by checking No. 6871 on the coupon and mailing.

No. 6878—Spray Sales Aids

Point-of-sale posters, information booklets and special can tags are being offered by McLaughlin Gormley King Co. as sales aids for its dairy spray products. The merchandising materials are designed for use at the store levels. The poster notes national publicity which is being given the sprays. The booklet contains a step-by-step program for controlling flies. The snap-on tags give quick point-of-sale identification for sprays containing repellents, the company said. For more information, check No. 6878 on the coupon and mail to this publication.

No. 6876—Pre-Emerge Spray Kit

Tryco Manufacturing Co. announced a pre-emerge spray kit designed to fit all row crop planters to apply spray materials in a band on the crop rows at the same time the seed is being planted. The kit consists of mounting brackets that adjust to any angle to give the proper spray



pattern, a stainless steel line strainer, hoses, clamps and all necessary fittings. A variety of kits are available for two, four and six row planters, the company says, and they are designed for use with presently owned spray equipment. Complete information, literature and application data is available upon request. Check No. 6876 on the coupon and mail.

No. 6875—Loader for Tractors

An industrial loader specifically designed for International Harvester 240U and 340U tractors has been announced by Superior Equipment Co. There are two models, H-228-I with double acting lift rams, and H-128-I with single acting lift rams. Both models have dual bucket rams, independent hydraulic systems, box

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

No. 6880—Weed and Grass Killer

A pelletized weed and grass killer has been announced by Chipman Chemical Co., Inc. The material, called "Chlorea Granular," contains sodium chlorate, sodium metaborate and monuron. According to the company, this combination kills deep-rooted weeds and grasses and has prolonged soil-surface action on shallow-rooted grasses, weeds and seedling growth. The dry pellets can be applied with any mechanical spreader used for application of granular materials; or may be broadcast by hand, the company says. One pound will treat about 100 sq. ft. of weeds and grass. Check No. 6880 and mail for details.

Send me information on the items marked:

- ☐ No. 6869—Crabgrass Preventive
- ☐ No. 6870—Forest Fertilization Handbook
- ☐ No. 6871—Polymer Tank Linings
- ☐ No. 6872—Bulk Fertilization Booklet
- ☐ No. 6873—Jet Pump Line
- ☐ No. 6874—Chemical System Brochure
- ☐ No. 6875—Loader for Tractors
- ☐ No. 6876—Pre-Emerge Spray Kit
- ☐ No. 6877—Data on Airplane
- ☐ No. 6878—Spray Sales Aids
- ☐ No. 6879—Polyethylene Coated Bags
- ☐ No. 6880—Weed and Grass Killer
- ☐ No. 6881—Brush Control Pellets
- ☐ No. 6882—Fertilizers Spreaders
- ☐ No. 7389—Car Shaker Data Sheet

(PLEASE PRINT OR TYPE)

NAME .....

COMPANY .....

ADDRESS .....

CLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS PERMIT No. 2
(Sec. 34.9, P. L. & R.)
MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

P. O. Box 67

Reader Service Dept. Minneapolis 40, Minn.

type lift arms, tubular frames and pry-out bucket action. The bucket clears 10 ft. 11 in. at full height. The company says a complete variety of attachments including buckets, manure forks, crane, fork lift and front dozer blades are available. Check No. 6875 on the coupon and mail for details.

No. 6870—Forest Fertilization Handbook

American Potash Institute has issued a handbook on forest fertilization. The handbook contains articles by leading world authorities on forestry. Various aspects of research and practices in Europe are discussed and progress in diagnosing nutrient needs of forest trees through soil

testing and leaf analysis is covered. Other subjects handled are: "Forest Fertilization Possibilities in the U.S.," forest fertilization in Germany and forestry research in the U.S. and Canada. Copies are available on request by checking No. 6870 on the coupon and mailing.

No. 6873—Jet Pump Line

A new series of Olympian jet pumps has been introduced by the F. E. Myers & Bro. Co. The line is offered in three basic models. The Medalist is a convertible, two-stage jet pump, available in ½ to 1 h.p. sizes. The Challenger is a single stage convertible jet pump in ½ to 1 h.p. sizes. The Pacer is available in ⅓ and ½ h.p. sizes, either shallow or deep well. All models are also available as

pump-tank units. Complete details on all models can be obtained by checking No. 6873 on the coupon and mailing to this publication.

No. 6877—Data on Airplane

An illustrated brochure, containing information on the new Grumman Ag-Cat, an agricultural airplane, is being released by Mid-Continent Aerial Sprayers, Inc. According to the company, the plane can be used for seeding, fertilizing, dusting and other agricultural uses. The brochure, which is done in two colors, contains photos of the Ag-Cat in flight and on the ground. Specification and performance tables are included. For copies, check No. 6877 on the coupon and mail.

No. 6874—Chemical System Brochure

An eight-page brochure, available from Technicon Controls, Inc., describes the AutoAnalyzer, an automated system for continuous chemical analysis. The system, according to company literature, can analyze trace materials down to parts per billion, and continuously record results with an accuracy of 1%. The brochure discusses the unit's use in the laboratory. Principles of the operation of the system are detailed. A complete description of the system's components is included. For copies, check No. 6874 on the coupon and mail.

No. 6872—Bulk Fertilization Booklet

"Your Land is Different," a booklet which points out advantages of bulk fertilizer use, has been prepared by Highway Equipment Co. The booklet contains tips on restoring plant foods, soil testing, liming, proper application of fertilizer and effective spreading patterns. The booklet also discusses bulk spreading methods and equipment. For a copy, check No. 6872 on the coupon and mail to this publication.

No. 6869—Crabgrass Preventive

"Chip-Cal Granular," a crabgrass preventive for use on established turf, has been announced by Chipman Chemical Co., Inc. The granular material is ready for use and can be applied by a mechanical fertilizer spreader or portable seed-sower. According to company literature, the product prevents crabgrass from growing by killing the germinating seed and seedling plants. At the same time, the company says, it will suppress annual bluegrass and chickweed, and certain soil insects and grubs. The material contains a low-lime calcium arsenate. Details can be obtained by checking No. 6869 on the coupon and mailing to this publication.

FERTILIZER SALES

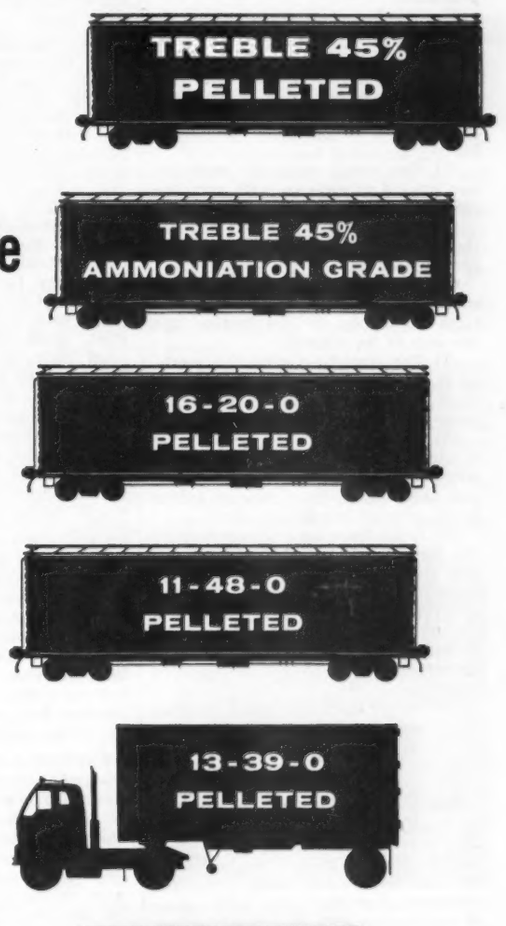
CLEMSON, S.C. — Fertilizer sales in South Carolina during January, 1959 amounted to 56,071 tons or more than twice the 25,022 tons sold in the same month the previous year. B. D. Cloaninger, director of the fertilizer inspection and analysis department, Clemson College, reported that for the six months ending Dec. 31, 1958, sales amounted to 134,202 tons, compared with 116,874 tons for the same period in 1957.

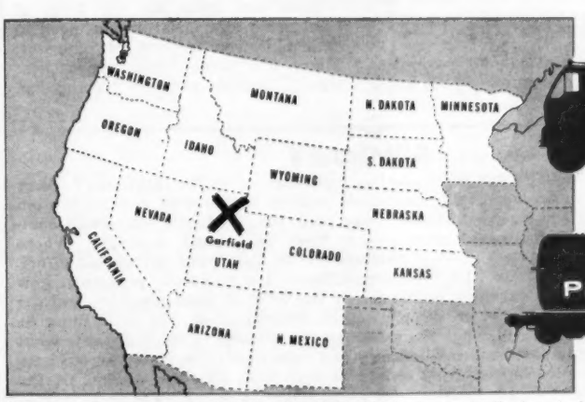
Prompt delivery...
straight or combined loads...
anywhere in the West...

your shipment gets there FAST when you order ANCHOR phosphates!

Your customers get the fast service they like when you order *Anchor* for their phosphate needs. Western Phosphates' centrally located plant at Garfield, Utah, and network of in-transit warehouses assure prompt delivery to Western growers.

For full information, call any office of Wilson & Geo. Meyer & Co., Intermountain, sales agent for these 7 Anchor products. They will expedite your order.





Western Phosphates' plant at Garfield, Utah, is centrally located to serve all the west... fast!

ANCHOR
PELLETED PHOSPHATE FERTILIZERS

Produced by WESTERN PHOSPHATES, INC., Garfield, Utah

Distributed by
WILSON & GEO. MEYER & CO.
INTERMOUNTAIN
CALIFORNIA: San Francisco, Fresno, Los Angeles, El Centro — ARIZONA: Phoenix — OREGON: Portland — WASHINGTON: Seattle —IDAHO: Twin Falls—COLORADO: Denver — UTAH: Salt Lake City

Paying Salesmen—How Do You Go About It?

By KENNETH R. DAVIS
Professor of Marketing
Amos Tuck School of Business Administration, Dartmouth College
Hanover, N.H.

Management is responsible for paying several distinct personnel groups, among them executives, clerical and supervisory personnel, shop help and salesmen. Certain fundamentals apply to all of these groups, but special problems peculiar to each result in rather wide variations in the design and administration of compensation plans. For salesmen, there is a special significance in the effect of compensations on motivation and control. This Aid examines some of the chief aspects of compensating salesmen in a small company. While a number of specific considerations exist in this area, it is useful to approach them as parts of two basic problems: determining the level of compensation, and determining the method of compensation.

The number of salesmen within an individual company is often small, although they often play an important role in the company's success. In this connection, some of the main sales-force-compensation problems peculiar to the small company are the following:

(1) The small company probably has limited experience with compensation problems.

(2) It may have a rapid growth, thus affecting the sales-force compensation level.

(3) Salesmen's importance in a small company's growth raises questions of equity in distributing the rewards of its success.

(4) The straight-commission method is most common and the limitations of this type of compensation most evident, in small companies.

(5) Personal selling is probably the dominant selling method of the small company and salesmen's compensation is an especially significant factor in its over-all marketing effort.

(6) Sales-force supervision may be less formalized and sales performance and the compensation plan may be more difficult to measure.

(7) Elaborate statistical methods for measuring market potentials, which aid supervision in large companies, are not likely to exist in small ones.

Obviously, the small company does have some advantages, too, in the area of sales-force compensation. Dealing with fewer men, it has a more intimate knowledge of each man's performance. It can appraise by more direct methods the success of a particular pay plan. Administering the plan can be less time consuming and complicated. But these advantages may lead to a false sense of satisfaction with the existing sales-force compensation plan.

A Top Management Problem

It may seem unnecessary to suggest that salesmen's compensation must be recognized as a management problem. Yet, many companies, especially small ones, seem to consider traditional compensation practices inviolable. Little or no attempt is made to appraise them objectively, although within an industry, individual firms may face markedly different compensation problems.

Once you have accepted salesmen's compensation as a management problem, what do you do next? Most experts say, assign responsibility for this function to one executive. In a small firm he will probably be the sales manager or the president.

But don't stop there. Administering compensation is a continuing function. As such it calls for both periodic review and standard procedures to assure its satisfactory operation. Policies should be developed carefully and put in writing. And give the details to your salesmen.

Determining the Level of Compensation

In developing these policies it will be desirable to write up a salesman's job description. This is important because it involves a careful appraisal of the salesmen's roles in the marketing "mix." Those descriptions should bring out not only what each salesman has to do, but also what he has to know. Such standards are essential in working out the level of compensation. A job which requires special skills and heavy responsibilities obviously commands higher pay than one which does not.

The general caliber of salesmen your company needs is the next point to decide. One firm can build its sales force around $5,000-a-year-men, another needs men earning $25,000. To determine the appropriate level for your business, begin by sizing up the salesmen's contribution to your company goals.

Here the job description will tell what they do, but will not place a specific value on those things. Nevertheless, the analysis required to describe the salesman's job will indicate the caliber of man needed and the approximate range of pay required. With that in mind, you can turn to certain guides. These include:

Surveys of Salesmen's Earnings. A number of organizations—including the Dartnell Corp., National Sales Executives, Inc., and the National Industrial Conference Board—have made such studies. In a few industries, trade associations have compiled data on salesmen's earnings. They may be helpful as broad guides. Sometimes, of course, they are too broad to indicate much about pay levels in specific industries. And, if your firm deviates from industry selling patterns, these figures may be less applicable. All the same, it is worth while to check the available figures.

Conditions in the Sales-Personnel Market. In the final analysis, the sales-personnel market is the best place to find out what you have to offer to get a particular type of man. Recruiting difficulties and high sales-force turnover are useful indicators. You may also get information from conversations with men in firms selling under conditions similar to yours.

Pay Scales Within Your Firm. The practice of arraying all company jobs according to how much they pay can be helpful. Salesmen must fit into the over-all pattern. On the one hand, they may deserve more than your office force because they contribute more to the success of the company. On the other hand, they should not get more than the executives who supervise them.

Over-Compensation. Over-compensation is more common than many suppose. A small company is often a new company. Its salesmen's-pay plan is based on some assumed sales volume estimated early in the concern's life. When sales actually rise more rapidly than has been forecast, the pay plan—if it is a straight-commission or salary-plus-commission—can lead to over-compensation.

It is important, therefore, to recognize this possibility and come to an understanding with your sales force about it. Very often small companies have permitted outmoded pay plans to continue despite the fact their salesmen's earnings reached completely unrealistic levels.

Here is a case in point as related by a small-plant owner-manager:

"Our company was started in 1945. By 1947, we had acquired four salesmen. When these fellows were hired, we negotiated with them on the basis of a commission. Due to our lack of realization of how much we would actually sell, the rate was relatively high. In 1949, one man earned around $25 000.

"We felt that these men were overpaid for their actual contribution. The promotional work we were doing caused the product to move. The inherent quality of the product caused the consumer to repeat. Also, we knew, from having done selling work ourselves, exactly what the men had the opportunity to accomplish.

"When we made the decision to change their rate of compensation, we were acutely concerned over their reaction, because we could see only one way for their pay to go—down, and drastically so. However, we concluded that if we had made an honest mistake in setting the commission rate too high, if our evaluation of the relative contributions of company and individual was fair and if no facts had been overlooked, then these men, having high personal integrity, would recognize the validity of our position, and would accept a temporary setback for a long-range gain.

"Having arrived at this point, we called the men in individually, and presented our case in a perfectly free atmosphere. All of them went along willingly with our wishes. They are still with us today. The $25,000 fellow was cut to about $16,000 a year. The other cuts were comparable in magnitude. Not one of these men has yet got back to where he was financially, but they feel that there are other values in their relationship with us."

Determining the Method of Compensation

Once you have set the level of salesmen's compensation you need to determine the method of payment. There are three basic approaches: straight salary, straight commission, or a "combination" plan. A combination plan represents a balancing of some fixed income (salary) with some variable income (commissions, bonuses, profit sharing and the like).

Combination plans have steadily increased in popularity. Today about 60% of all U.S. companies use them. The other 40% divide about equally between straight commission and straight salary. For most small firms, the choice is not among the three basic pay plans, but rather among the innumerable combination plans.

NOTE: A special element in any of these basic plans is the manner in which salesmen are reimbursed for travel expenses. In addition, some companies offer "hidden" income in the form of pensions, insurance and other fringe benefits. However, the details on the role and management of travel expenses and fringe benefits must be omitted. These are, to be sure, important management problems, but their consideration here would prevent focusing attention on the basic compensation plan itself.

What determines the choice of pay plan? Four standards should be applied. They are: control, incentive, flexibility and simplicity.

Control. The type of compensation plan used will have a direct bearing on the amount and kind of sales-force activity. A company's control over a salesman varies directly with the proportion of his salary to his total compensation. The straight-salary plan obviously provides the maximum amount of this type of control. A salesman on straight salary earns the same amount regardless of how he spends his time or which product he pushes. On a combination plan the proportion of salary to total income should reflect the degree of control sought.

Thus, if you want your sales force to spend substantial time on indirect selling efforts, or even nonselling efforts, you should include a good deal of salary in your compensation plan. Missionary selling, extension prospecting, repair work, and delivery services are examples of indirect-selling or nonselling activities that call for salary.

Recognize that while the introduction of a salary element may increase your control over sales-force activities, this increased control brings with it management supervision. By giving salesmen salaries, you state in effect that you intend to determine the kind of selling effort needed. Salaries imply centralization of sales responsibility. In many small companies there is no executive in a position to assume this responsibility. They should, therefore, turn to combination plans with high percentages of commission income, or even to straight-commission plans.

Although control is the major reason for a salary element in salesmen's compensation plans, you quite frequently hear that its purpose is to take care of salesmen's normal living expenses. This view is unsound. Most combination plans in use today provide about 60% salary and 40% commission (or some other variable incentive element), and few, if any, salesmen establish their household budgets on 60% of their income.

Incentive. The portion of pay in a combination plan that is not base salary usually represents incentive compensation. It can range from an indirect incentive (a modest sharing of company profits), to very direct incentive where income stems from commissions. The incentive should be large only if there is a direct relationship between the salesman's effort and the sales objective. This objective is usually volume, but incentives are sometimes paid for activities that have only a long-run effect on sales, such as sale of advertising materials. The relationship is least direct when a number of people contribute to sales—engineers, top man-

SUMMARY

Are you paying your salesmen the right amount in the right way? Many sales managers are uncertain about their policies in this area. Salesmen often wonder about the logic behind their pay plan, too. Certainly salesmen's compensation is an important management issue in a small company. Where salesmen are few, each plays a leading role in the firm's marketing effort. Best results come only with proper pay. There are two basic problems: how big the salesman's earnings should be, or the level of compensation; and the arithmetic behind them, or the method of compensation. The level must be decided on the basis of what the salesman contributes to the company, what the going pay is for such a salesman, and how much the company pays its other employees. Compensation should be fair from all these angles. Of the three basic methods for figuring how much money a salesman is to be paid—straight salary, straight commission, or a combination plan—the first two have long been familiar. Most current variations derive from combination plans. These involve a balancing of some fixed income (salary) with various sorts of variable income (commissions, bonuses, profit sharing, and the like). Today, about three out of five concerns pay their salesmen using a combination plan. In setting up a pay plan, four objectives should be reached: control of sales-force activity; incentive to better performance; flexibility as to selling costs, territories, products, and individuals; and simplicity. This article was prepared with the cooperation of the Small Business Administration.

agement and perhaps other company personnel.

Then again, the incentive should be in direct proportion to salesmen's motivation. A small incentive serves only to dull the interest of a highly motivated man; a very large one will be wasted on the man with a low level of motivation. In fact, a man unable to reach the income level contemplated by his pay plan will become discouraged and discontented with the company, the job and himself.

Finally, the incentive should be varied and shifted so as to direct the salesmen's efforts to the most productive type of activity. In this way it is a powerful sales-management tool. For example, incentive compensation can be paid for balanced selling, or for opening new accounts, or for large orders, or for sale of high-margin items and so on.

Flexibility. Flexibility is one of the hardest objectives to achieve. And one of the major reasons that combination plans have become more popular than straight salary and straight commission plans is their greater flexibility. The term can mean a variety of things. Four are considered here:

(1) Flexibility in selling costs. This is the first consideration for most small companies. With limited working capital and uncertain markets, there is a great attraction for small companies in the variable cost of straight commission or a combination plan with a large commission element. When sales drop off, costs do, too. This feature will often be the overriding one in selecting a pay plan. But even if you seek completely variable selling costs you must still establish the size of the commission and the basis on which it will be paid. Commissions can vary by product, customer or type of selling effort.

(2) Flexibility among territories. This means that a pay plan can be adapted to suit conditions in different sales territories. The sales potentials of different regions often vary widely. Unless the pay plan compensates for this fact, the salesman in a growing territory will have steadily increasing earnings while the salesman in a poor area will have little to show for his efforts.

(3) Flexibility among men. Even small organizations include men at varying stages of development. Trainees usually require a special pay plan. But differences in skill and experience must also be recognized among regular salesmen. While this is sometimes accomplished by shifting men geographically, salesman-customer relationships may make transfers undesirable. The compensation plan is a better way to handle individual differences.

(4) Flexibility among products. Many small plants make several products, which require quite different selling efforts. Such concerns need a salesmen's compensation plan which can reflect this situation. Unless it does, a salesman may well neglect that part of the market from which he gets the least money.

Simplicity. A final consideration is the need for simplicity. Complicated plans are hard for your salesmen to understand, and costly to administer. Considerable dissatisfaction may result if salesmen cannot see a direct relationship between their efforts and their income. Simplicity, of course, is best achieved with straight commission. In actual practice, however, it is usually better to sacrifice a little simplicity to gain some flexibility, incentive, or control. Most small companies are better off if they don't copy the big concerns, but stick to pay plans which grow out of their own selling situations and the kinds of salesmen they have.

MORE MICE

SACRAMENTO — Richard Bethell, El Dorado County farm adviser, reports that warm weather has promoted the meadow mouse population in his county and damage to fruit trees has been heavy in some areas.

FARM SERVICE DATA

Extension Station Reports

"You can't fool growing plants when it comes to their food supply," reports Marshall Christy, University of Missouri extension soils specialist.

Both legume and non-legume crops need a "full dinner pail" providing an adequate and well-balanced diet of nutrients to produce high, profitable yields, says Mr. Christy in a statement summarized by the Midwest division of the National Plant Food Institute.

The plants require plenty of nutrients through their growing season, Mr. Christy adds.

"Liming is often the first soil treatment needed to make soils more productive," Mr. Christy says. "Soils with a 'poor lime' situation usually need lime to correct the acidity."

Increases in crop yields due to liming and the liberal use of fertilizer will step up the removal of plant nutrients from the soil. This is true of all nutrients, including those supplied by limestone.

Mr. Christy points out that limestone not only can supply the soil with calcium and magnesium, but it improves the effectiveness of other nutrients. Nitrogen does a better crop feeding job and phosphate is more available to growing plants when the soil has a "good lime situation," he says.

"Profitable production of high quality grain and forage crops depends largely on providing a well-balanced supply of nutrients from the soil."

The fall and winter seasons are an ideal time to spread limestone on fields where tests show a need, Mr. Christy says. Spreader trucks can get onto fields easier because the ground is firmer. Later on, plowing or deep discing is a good way to work the lime down into the soil, he points out.

★

Lime applied to acid soils prior to growing such crops as cotton, corn and soybeans, increases crop yields, Dr. W. D. Bishop, University of Tennessee agronomist, says.

Long-time experiments conducted on cotton at the Jackson experiment station indicate that the extra cotton yield obtained the first year more than paid for the cost of liming. The yields of cotton continued to be higher on the limed soils for several years. Similar results have been obtained on other crops.

The availability of phosphate is increased by applying lime on acid soils. The effectiveness of fertilizers is also increased where acid soils have been limed. In addition to these benefits, lime supplies calcium and magnesium directly to the crop.

It is important, therefore, Dr. Bishop explains, that lime be applied for row crops as well as for legumes. Soil testing is one of the best methods available for determining the amount of lime needed on any particular field. In addition, a soil test provides information on the fertility status of soils. Based on soil test results, fertilizer needs can be planned by farmers early. Proper use of lime and fertilizer should result in higher net profits during 1959.

★

Fertilizer will be one bright spot in the 1959 farm cost picture, reports the Midwest division of the National Plant Food Institute, in citing U.S. Department of Agriculture forecasts.

Virtually everything else a farmer buys for use in farm production will cost more in the new year, USDA indicates.

"Wages paid to hired labor and prices paid for nonfarm goods and services, except fertilizer are still rising, and probably will average higher in 1959 than in 1958," says a statement by USDA economists.

"Prices of fertilizer are expected to remain at about present levels."

The farmer's best chance of beating the price-cost squeeze and increasing his 1959 income, says NPFI lies in: 1—Building his individual volume of production; 2—Reducing his cost of production per acre, per bushel and per ton.

The key factors in such a program are proper use of fertilizer, improved and adapted varieties of seed, labor-saving tillage practices and insect control, says NPFI.

Fertilizer can help the farmer boost his crop producing efficiency, increase his yields per acre, cut his costs and give him a higher income per acre and per unit of crop production, the institute points out.

★

Fertilizer will be one of the farmer's best weapons for beating the cost-price squeeze in 1959.

That is the statement of the midwest division of the National Plant Food Institute, in citing a U.S. Department of Agriculture forecast.

The department indicates that virtually everything but fertilizer will cost the farmer more this year.

"Wages to hired labor and prices paid for non-farm goods and services, except fertilizer, are still rising," says USDA. "They will probably average higher in 1959 than in 1958.

"Prices of fertilizer are expected to remain at about the present levels."

Fertilizer use based on soil tests and recommendations by agricultural colleges, can help the farmer build his individual volume of production and cut his costs of crop production, NPFI points out. Other essential items in such a program are the use of improved and adapted varieties of seed, labor-saving tillage practices and effective insect control.

CLIENTELE

(Continued from page 9)

and it is used for custom spraying. During the growing season it is kept busy most of the time, spraying fruit trees, small bean patches and along turn rows.

One of the unique features of the store is the monthly letter sent out to 400 customers. Mr. Tanner writes it and has aptly named it Tanner's Tips. He uses a chatty style, writes about flowers and garden plants and gives hints on how to care for them. He also mentions products at the store and how they can aid the gardener and orchardist.

"Our radio program has attracted quite an audience," he explained, "because I follow about the same lines. I broadcast a 15 min. program once a week and spend part of the time answering questions which have been sent in by mail. I read the names of the person and that helps, because people always like to have their names used in public."

The store also has a landscaping service, which Mr. Tanner operates. He bids on jobs, does the plowing, planting or bedding, and nurses the project along until the owner can handle it himself.

This has been a lucrative sideline. The store got the landscaping contract on the court house, schools, hospitals, football fields and several commercial jobs. The contract for one residence amounted to $2,500.

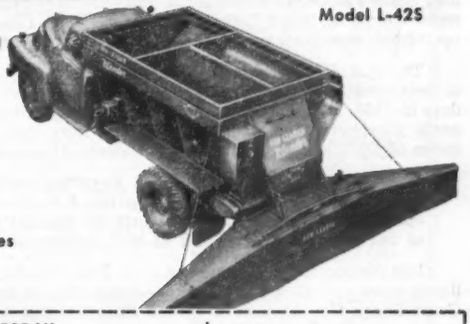
"The main thing in launching a program of this sort," said Mr. Tanner, "is to know something about horticulture and landscaping, have good equipment, give service and don't expect to grow too fast."

One other idea that brought in extra sales has been Mr. Owens' practice of displaying only one or two items outside the store. The building has a recessed 15 by 25-foot porch at the front. Instead of filling it with miscellaneous items, he places only one or two displays each day.

Despite the large variety of items and services, Mr. Owens is still not satisfied. Whenever a need arises or he can create one for a new product or service, it's a mighty safe bet that it will be found at the Mesa Feed & Supply.

Rubber-lined Steel
FERTILIZER TANKS
APPLICATOR STORAGE
SKID-TYPE NURSE
• 15 different stock sizes
• 55 gals. to 12,000 gals.
• Immediate to 10-day delivery, lowest prices
ABRASION & CORROSION ENGINEERING COMPANY
P. O. BOX 3085 PHONE DRAKE 6-5555
AMARILLO, TEXAS

Accurately Blends and Spreads 3 Fertilizers at Once!
NEW LEADER MOBILE BLENDER
Model L-42S
• Lets you offer mixed analysis at lower, bulk rates!
• 3 Separate compartments!
• 36" Conveyor synchronized to speed of truck by drive shaft drive!
• 7.0 H.P. Engine drives Twin Spinners!



MAIL TODAY
HIGHWAY EQUIPMENT COMPANY
678 D Ave. N. W. Cedar Rapids, Iowa
NAME.....
ADDRESS.....
TOWN.....STATE.....
Mail coupon for L-42S literature and a copy of "Your Land Is Different" a booklet designed to help you sell more bulk fertilizer.

What's Been Happening?

This column, a review of news reported in Croplife in recent weeks, is designed to keep retail dealers on the regional circulation plan up to date on industry happenings.

Trade sources available in Washington forecast a healthy demand for fertilizer materials from the farm community this crop year, reported John Cipperly, Croplife Washington correspondent. Field reports indicate that increased farm inquiries and actual sales are now being reported from corn and cotton producing regions.

The San Francisco Chemical Co. has acquired new holdings estimated to contain nearly 15 million tons of convertible phosphatic material at high level, assuring the company reserves in the Crawford and Leefe, Idaho, area for more than 40 years, D. L. King, president of the firm, announced.

Sen. Estes Kefauver (D., Tenn.) has authored a Senate resolution giving authority to the subcommittee on antitrust and monopoly of the Senate Judiciary Committee to make an investigation of prices in several industries, including the fertilizer industry. An appropriation of $395,000 has been made for the work of the subcommittee.

Natural gas soon will replace imported coal in the manufacture of ammonia and ammonium nitrate at the Welland plant of Cyanamid of Canada, Ltd., Dr. L. P. Moore, president of the American Cyanamid Co. subsidiary, has announced.

The top engineering research need in crop production is for analysis of pesticide application equipment and methods, according to the U. S. Department of Agriculture Farm Equipment and Structures Research Advisory Committee which met in Washington recently.

An eloquent plea for the fertilizer industry to make better businessmen out of its dealers; a first-hand report of recent advancements made in Russian agriculture; the premier showing of a new grassland pasture motion picture, and reports on crop yields in a number of states featured the program of the 11th annual joint meeting of midwestern college agronomists with the fertilizer industry in Chicago Feb. 12-13.

"DDT Trial" plaintiffs, who failed in court to stop mass aerial sprayings, have appealed their case on nine separate points. The 14 Long Island, N.Y., residents filed their appeal with the U.S. Court Oct. 28, but it was not known until recently on what points the plaintiffs made their plea.

Fewer boll weevils took cover in woods trash near cotton fields this winter than last in seven cotton-producing states, according to a U.S. Department of Agriculture survey. The number that survives the winter, combined with weather conditions during the early part of the cotton fruiting period, will determine this insect's potential for damage to the 1959 cotton crop. Lowest average counts for an area were found in south Georgia—145 weevils per acre—and highest in northeastern Louisiana—5,756 per acre.

Merger negotiations between Smith-Douglass Co., Norfolk, Va., and Wilson & Toomer Fertilizer Co., Jacksonville, Fla., first announced last fall, have now been terminated.

Dempster McIntosh, managing director of the Development Loan Fund, has signed an agreement by which the U.S. will lend $12 million to the Kingdom of Greece to assist in establishing a nitrogenous fertilizer plant. The signing completed action on a transaction approved and announced by the Development Loan Fund last June.

A marked decrease in the average abundance of European corn borers found last fall throughout the U.S., as compared with corn borer numbers found in the fall of 1957, was noted in figures recently released by the U.S. Department of Agriculture. However, 58 additional counties were reported infested for the first time in 1958, according to plant pest control officials of the USDA's Agricultural Research Service.

"We must keep in step with the farmers in helping them solve their problems and supply their needs," Dr. D. E. Wolf, the Du Pont Co., Atlanta, Ga., told more than 175 persons attending the Pesticide School at North Carolina State College in Raleigh recently.

Completion of its current program of modernization in its Ontario fertilizer plants has been announced by Canadian Industries, Ltd., Toronto.

South Dakota fertilizer dealers made tentative plans to organize a fertilizer dealers association during the ninth annual fertilizer and soil management short course at South Dakota State College in Brookings. A meeting to set up formal organization had been set for Feb. 23, at Brookings.

The U.S. Department of Agriculture has reported that carryover stocks of pesticides on Sept. 30, 1958, averaged about 10% lower than on the same date in 1957. Larger carryovers of new materials than in 1957, especially organic phosphates and weed killers, were more than offset by shorter inventories of DDT and grain and soil fumigants, the report said.

A credit of $5 million to an Egyptian fertilizer company to finance purchases of equipment in the U.S. for an expansion of its operations was announced recently by Samuel C. Waugh, president of the Export-Import Bank of Washington.

Installation of new equipment at Fort Worth, Texas, to manufacture liquid weed control materials for railroad use has been announced by Pacific Coast Borax Co., division of United States Borax & Chemical Corp.

In the field of fertilizers, the top need is for research leading to development of fertilizers having controlled rates of nutrient release, said the U.S. Department of Agriculture's soils, water and fertilizer research advisory committee at its annual meeting in Washington recently.

Grasshoppers are likely to be more widespread, but less of a threat to western crop and rangelands in 1959, the U.S. Department of Agriculture announced with the release of figures showing the results of federal-state surveys made last fall.

Spencer Corn Growing Program Winners Show How to Get Better Yield Results

How efficient can you be in growing corn? Spencer Chemical Co. has come up with some answers to this question after tabulating the results of its 1958 Efficient Corn Growing Program.

For instance: The 35 top participants in the program grew 4,668 bu. of corn on only 35 acres for a total net profit of $2,860.

Representing 18 states, the youths were judged tops among the more than 2,000 boys who enrolled in the program.

In its fifth year, the Spencer program lets each youthful participant compete against himself in seeing just what can be done to improve the standard corn growing practices on his farm. His success is measured by balancing the improvement in yield and profit on one acre of corn grown with what he judges to be "improved" practices against the yield and profit from an acre grown with practices normally used. Assisted by his vocational agriculture teacher, he is required to keep detailed records and make accurate yield measurements. Improvement in efficiency, as measured by profit rather than bushels, is stressed above improvement in yield alone.

Indications are that the "improved" practices most generally chosen to boost efficiency were: increased use of fertilizer according to soil test, increased plant population per acre, use of adapted hybrid seed and increased weed and insect control. They resulted in an average yield increase of 61 bu. an acre on the "improved" plot. Although this increased the production cost, profit per acre was an average of $42 more than on the less-efficient "normal" practices plot.

While all of the boys rated as corn growing "efficiency experts," Spencer mentioned the following as being among the most outstanding from the standpoint of both profit and yield. Lowell Groff of Mansfield, Ohio, made $94.03 more profit on his "improved" practices plot than on his "normal" practices plot. His yield was 174.64 bu. on the "improved" plot. Jim Anderson of Baldwyn, Miss., made $89.90 additional profit with a yield of 170 bu. Top yield on the "improved" plot was 218 34 bu. raised by Glenn Smith, Medina, Ohio. Young Smith's yield earned him $82.88 additional profit. Another outstanding yield was recorded by Donnie Gadd, Big Hill, Ky., who harvested 188 bu. for an additional profit of $57.90.

LOCAL NEWS

(Continued from page 9)

for some outside activity.
....When an employee leaves your firm—retirement or moves to a new community.

Management Publicity—As one of the leading businessmen in your community, people are interested in what makes your business "tick." Naturally, you will not reveal any trade secrets, but your management ability is news—good publicity for your firm. Consider, for example, these ideas that will make good news releases:

....When you establish some new type of service for your customers.
....When you install some new type of business system in your operations.
....When you add a new line of farm equipment.
....When you purchase and install new equipment in your shop.
....When you expand your business—more area, parking lot, or branch operation.
....When you move your business to a new location.
....When you have some special anniversary of the founding of your business.
....When you make a trip to a factory or the market to review your season's plans.
....When you win a company contest or receive some other recognition for your management ability.

Industry Recognition—Newspaper editors are sometimes amazed when they find out that a local businessman has received some national recognition. Not because the editor does not feel the dealer has the ability, but because it was kept a secret on the local scene.

National recognition you receive is good. But, it can be more valuable if you let local people know about it. Local publicity will do it for you.

As a case in point, here are several opportunities for local publicity of national recognition:

....When an article about your firm appears in your business magazine.
....When you attend a dealers' convention in another city.
....When you are elected to an office in your association.
....When you give a speech at your association convention.
....When you are asked to express your opinion on the industry's business conditions.
....When your advertising receives some recognition on a national basis.
....When you or one of your employees wins a prize in some nationwide competition.
....When your current window display is novel enough to be newsworthy.
....When you are asked to serve on a committee to study some problem of the farm store dealers.
....When you make a trip to visit other progressive dealers in other communities.

Civic Activity—Newspapers, as a matter of policy, cover all civic events. A dealer who is active in civic affairs will automatically receive plenty of publicity. Here, for instance, are some events that will put your name in the news:

....When you are elected to an office in a service club or lodge.
....When you give a speech or introduce a speaker at some banquet.
....When you are active in your work for a local charity.
....When you work for a parade committee or enter a float in a local parade.
....When you donate or install a window display to give on-the-street publicity to some local event.
....When you work with a local fair committee or enter an exhibit in a county fair.
....When you do anything with your local schools—s c h o o l board, advisory board, etc.
....When you work with any local youth o r g a n i z a t i o n — Teen Club, Boy Scouts, etc.
....When you feel strongly enough about some civic issue to write a letter to the editor of your newspaper. (This is dangerous if any of your good customers are on the opposite side of the issue.)
....When you are elected to some civic office—mayor, city council, planning commission, etc.

The above list, used with discretion, can give a dealer a constant source of publicity ideas.

Doing Business With

Oscar & Pat

By Al P. Nelson

It was mid morning that March day when a tall, dark and handsome salesman came into the Schoenfeld & McGillicuddy Farm Store. There were raindrops clinging to his sleek black hair. He aimed a dazzling smile at plump, ulcerish Tilly Mason and said very cheerily, "Good morning! Is Mr. McGillicuddy in?"

Tillie smiled right back. She liked gentlemanly treatment like this, liked to feel goose pimples all over her from such direct attention.

"Oh, I'm sorry. He's out making calls in the country this morning. But his partner, Mr. Schoenfeld, is in."

The salesman looked at the railed-in office enclosure where arm banded Oscar Schoenfeld sat coatless and hunched over his desk figuring discounts.

"Him?" he asked.

"Yes," Tillie replied, making a face which could only mean one thing—supreme disdain.

The salesman blinked twice, got the meaning, then straightened and walked determinedly toward Oscar. He opened the gate to the railed-in enclosure and soon stood beside Oscar's desk. He stood there about a half minute, and Oscar didn't look up.

The salesman coughed discreetly. About 20 seconds later Oscar looked up. "Yes?" he said coldly. "I am very busy this mornink."

"Ah, you must be a successful man then," said the salesman smoothly. "All successful men are busy. But they are never so busy that they would pass up an opportunity to get more business at a profit."

"Ach, we got lots of business," Oscar said coldly. "Too much. We can't collect what we got."

The salesman cleared his throat. "Ah, yes, every business has collection troubles now and then. The idea is to get more customers who pay on time. And to do this you must build much good will. That's where we come in. I have many items, Mr. Schoenfeld, which will help you build good will."

"We're not buyink anything," Oscar said bluntly. "We got too much on the shelves now."

"Mr. McGillicuddy sent a letter to our company asking about our good will builders which we advertise," the salesman said smoothly.

"That Irisher!" Oscar choked. "He is tryink to spent money faster than I can safe it for the company! If you sell him anythink I won't sign the check. Ach, I haf had enough of his foolishness this month."

The salesman swallowed hard, then brightened as determination flowed into his soul.

"You'll sell more if you build your store traffic," he suggested. "So, when people come and pay their bills in the store every month after getting a statement, you give them a present."

"A present!" Oscar echoed angrily. "Why? They should gif us one for waitin' 30 days for our money."

"People like a gift," went on the salesman grimly. "You can start giving each customer a rain gauge when he pays his monthly bill. Those rain gauges will cost you only 19¢ in quantity. Or, give them a red, folding yardstick. That would cost only 35¢ each in quantity."

"Himmel!" cried Oscar. "I don't believe in bribink people to pay their bills. It's too expensive."

"No, it isn't," said the salesman eagerly. "If the customer knows he will get a small giveaway when he comes to pay a monthly statement, then he'll come here in person and not send his check by mail."

Oscar frowned. "Ach, what difference does that make?"

The salesman's eyes widened. "Why, when the customer comes to the store to pay his bill, he sees all your merchandise. He's exposed to your sales talk. Chances are he'll buy one or two items. If he stays home and mails in his check you don't make those sales."

"Ach, what foolishness," snapped Oscar. "Those farmers wouldt come in and get their free gift and then standt aroundt and shoot the bull till I can't standt it, and ask so many foolish questions I can't get my discount work done. Nein, nein."

A desperate look came into the salesman's eyes. "But-but a merchant should devote lots of time to customers who are in the store. This is the chance to sell them something. Your own work can always wait. Look, we have some nice baby books that cost only 54¢ each. You can have your name printed on them, and give one to every farm baby born in a local hospital."

"Ach, farmers have too many kidts now," Oscar snapped angrily. "That's why they can't pay their fertilizer bills. And the more kidts the more schools they say we got to haf, and then taxes go up again."

The salesman was not now trying to meet Oscar's arguments. "I've got a wooden cane," he said desperately. "Every farmer wants one. You can have a 'Give Away a Cane to Customers Day' and get every farmer in your trade area in to get one. Your name can be imprinted on each cane. Think of all the advertising you'll get with farmers walking all around using your canes."

"Ach, we ain't got that many crippled farmers," Oscar said logically. "Maybe only 10 I know of now."

"These canes will cost you only 87¢ each if you buy 500," the salesman panted.

"Five hundred at 87¢ each!"

Oscar said slowly, the horror of it creeping into his mind. Quickly he grabbed a pencil and began figuring. "$435!" he exlaimed unbelievingly. "$435!" He turned on the salesman. "You—you are as crazy as that Irisher. Get out! Get out! You haf wasted too much of my time."

Stiffly the salesman got to his feet and started toward the door. His eyes held a glassy look.

"Good bye," Tillie Mason said softly, hoping he would smile at her like he did when he had entered.

But he didn't. He walked outside with the unsteady gait of a man who has just had a double martini before dinner.

Books on Pesticides

WEEDS—Second Edition (1955)

W. C. Muenscher

Entire book has been revised and reset, with descriptions of seventy weeds added to the original list of five hundred, plus twelve new full-page plates depicting nineteen kinds. Keys and full descriptions provided for identification with detailed illustrations of 331. Types and sources of weeds, their means of reproduction and dissemination, and the amount of damage they inflict on crops. Specific directions for control, with reference to chemical methods of recent discovery $10.00

CHEMICAL BUSINESS HANDBOOK

Dr. John H. Perry

1,300 double column pages, the equivalent of several average books; 700 illustrations, by 124 contributors. Market research data section is 280 pages, business mathematics 200 pages, financial and accounting 142 pages, research and development 150 pages, sales and advertising 92 pages, twenty sections in all. The book deals with chemical management problems and is useful to technical men, engineers and executives, in the chemical and allied fields. Dr. Perry is editor of the Chemical Engineers Handbook, a companion publication $17.00

INSECT PESTS OF FARM, GARDEN and ORCHARD Fifth Edition (1956)

Leonard M. Peairs and Ralph H. Davidson

A standard text for 44 years. Includes insects affecting grasses, grains, cotton, legumes, vegetables, flowers, fruits, stored products, household goods and domestic animals. Contains a new chapter on insecticide formulations, spray mixtures, application equipment, etc. Material on forty new pest species added, including drastic changes in the illustration. 661 pages $8.50

DDT and NEWER PERSISTENT INSECTICIDES

T. F. West and G. A. Campbell

The first and major part of book is devoted to the physical and chemical properties, manufacture, formulation and applications of DDT. The second part deals with other chlorinated hydrocarbons whose insecticidal properties have been discovered recently and compares these new insecticides with DDT. The preparation of aqueous suspensions, solutions, emulsions, and dusts containing DDT, the compatability of DDT with other insecticides, fungicides and additions are covered in detail. Contains dozens of tables on the solubility of DDT in various solvents, the catalytic activity of accessory substances in the presence of DDT, analogues of DDT, the comparative toxicity, hydrolysis and solubility of DDT analogues, the toxicity of DDT for almost all important insects, etc. Many illustrations $8.50

APPLIED ENTOMOLOGY—Fifth Edition

H. T. Fernald and Harold H. Shepard

This text since 1921 has had an outstanding record of usefulness. The Fifth Edition preserves the general organization and coverage, with changes to improve the presentation and to incorporate new knowledge. Contains chapters on anatomy, physiology and development. The economic importance and control of insects are discussed in a general way with much attention to insecticides. The classification of insects is emphasized, with examples drawn from species conspicuous for being very harmful or decidedly beneficial. Specific control measure included for injurious forms. Last chapter considers other pest animals closely related to insects. 385 pages $7.50

DISEASES OF FIELD CROPS—Second Edition (1956)

James G. Dickson, Professor Plant Pathology, University of Wisconsin

Covers the diseases of cereals, grasses, legumes and fiber plants, which are the major food, feed and fiber sources throughout the world. More than 60 diseases incited by viruses, 40 by bacteria and 300 by fungi are listed and discussed in relation to field crop plants. Identification and information basic to its control, with emphasis on the problems of crop rotation, adaptation and the use of disease resistant varieties. This revised edition includes several new diseases, new illustrations and much recent research in the field $9.00

THE GARDENER'S BUG BOOK (1956)

Dr. Cynthia Westcott

The Complete Handbook of Garden Pests and their control. Information, scientifically accurate but easy to read on 1,100 insects, mites and other animal pests that attack trees, shrubs, vines, lawns, flowers, fruits and vegetables in home gardens. Illustrations in full color. Control measures combine the latest in chemical developments with time-honored cultural measures. Helpful to all who serve the general public and to truck farmers and fruit gardeners. 579 pages, cloth bound $7.50

THE CHEMISTRY AND ACTION OF INSECTICIDES

Harold H. Shepard, Entomologist, U.S. Department of Agriculture, formerly Associate Professor of Insect Toxicology, Cornell University.

Treats the chemistry of insecticides, the history of their use, their commercial importance here and abroad, the nature of the major uses, the influence of environment on effectiveness. Materials are arranged according to their chemical relationships. Two chapters relating to organic compounds largely new as insecticides. Illustrative data in form of tables, and a convenient appendix of equivalents arranged for practical use in the field. 504 pages..... $8.00

WEED CONTROL

W. W. Robbins, A. S. Crafts, and R. N. Raynor

A textbook-manual presenting a modern view of the rapidly developing field of chemical weed control. Reports in detail the research on which most modern herbicide usage is based. Weeds, their reproduction, prevention, biological control, chemicals in weed control. Herbicides, foliage contact applications, hormone-like substances, root applications, evaluations of combinations of chemical applications. Weeds of grasslands and turf. Special weed problems, cropped and uncropped areas. Published 1952. 503 pages, 155 illustrations $8.50

INSECT, FUNGUS AND WEED CONTROL

Dr. E. R. de Ong

The information is grouped according to field of application rather than to chemical composition or nomenclature. Chapters on insecticide label, seed disinfectants, herbicides, forest insects and diseases, livestock insects, and the pests found in household and industry. Fumigation of warehouses, residual sprays and preservatives for fruits, vegetables and wood products are covered. An up-to-date guide on pest control with the needs of operators, agricultural and structural specialists carefully considered. Shippers and warehouse personnel will find the book useful..... $10.00

Order From Croplife

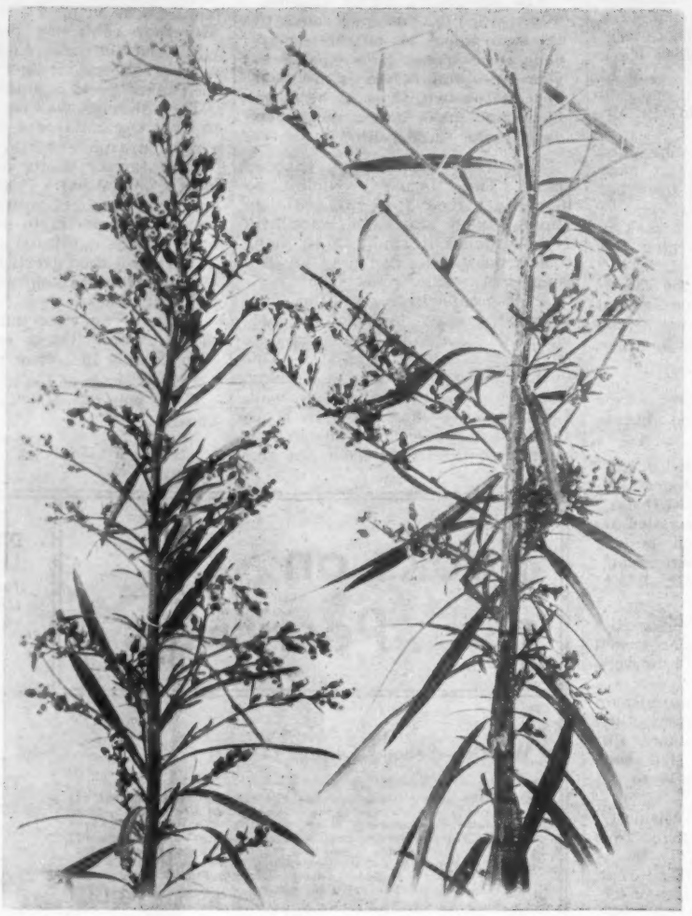
Reader Service Department
P.O. Box 67
Minneapolis 40, Minn.

(enclose remittance)

WEED OF THE WEEK

Horseweed

(Erigeron canadensis)



How to Identify

Horseweed is an erect plant, growing to heights as tall as 6½ ft. They have a fibrous root system, and leaves are alternate, simple, short-petioled, and hairy. Flowers are small, in composite heads, the disk flowers whitish, and the ray flowers are small, hardly larger than the disk flowers. The plant flowers from June to October, and seeds from July to November. Its distribution is general throughout the U.S., an exceptionally common and abundant weed. It takes over abandoned fields quickly, particularly in the summer. Aside from its common name of horseweed, the plant is otherwise known as "Canada Fleabane" and "Mare's-Tail."

Damage Done by Horseweed

This aggressive weed is quick to "take over" pasture lands, crowding out valuable plants and, of course, using water, light, and soil nutrients that could be put to much better use for the furtherance of other crops.

Habits of Horseweed

An annual plant, horseweed is reproduced by seeds. Although it is native to grassland, it spreads freely to waste places, including roadsides, fields and gardens. A large number of tiny white flowers are produced by each plant, and the flowers form a loose head on the top of the plant. The seeds are slightly curved, and have a number of parachute-like yellowish-brown bristles on one end which allows them to be carried by the wind, thus spreading the plant over much broader areas.

Control of Horseweed

Both chemical herbicides and cultural methods may be employed for control of this weed. In the latter, state authorities have recommended that the plants be mowed when the first flowers appear, thus preventing seeds from being produced. Since horseweed appears largely in pastures, chemical control comes under provisions of Federal Law regarding residue tolerances. Although there are a number of effective chemical compounds available for control of horseweed, their use should be undertaken only after consultation with local authorities.

Illustration of Horseweed furnished Croplife through courtesy of U.S. Department of Agriculture.

COTTON

(Continued from page 1)

areas of California, according to Dr. R. H. Bassett, fertility specialist at the U.S. Cotton Field Station, Shafter.

Dr. Bassett said that in California rather widespread zinc deficiencies are known to occur on citrus and other fruit and horticultural crops.

In one area of the San Joaquin Valley, young cotton plants fail to develop normally and growth is almost completely checked until well into the season. He said recent developments show zinc deficiency is a prime factor in this disturbance.

He reported foliar applications of zinc sulphate or some other zinc compound at frequent intervals have been effective in overcoming the deficiency. The applications promote a more normal growth, flowering, and fruit set with attendant yield increases particularly in early pickings.

Nitrogen is by far the most important fertilizer nutrient in cotton production in California and other western states, Dr. Bassett continued. In the San Joaquin Valley, 50 to 150 lb. per acre of nitrogen have generally produced the most economical returns. In the lower desert valleys which have a longer growing season, higher rates have sometimes given best returns.

Timing of insecticide applications is the key to economical cotton insect control, according to T. H. Siek, ranch manager for J. G. Boswell Co., Litchfield Park, Ariz.

Mr. Siek said countless dust or spray jobs have failed, not because of improper rates or the wrong material or poor application, but because of poor timing.

He said in the majority of cases where poor timing has resulted in either little or no control of insects, the cause has been due to a too hurried check or too long a time between field checks.

Five phases of economical insect control cited by the speaker included: (1) level of harmful and beneficial insect infestation, (2) rates, (3) materials, (4) application, and (5) timing.

He feels the business of insect control is becoming progessively more technical and that the farmer must have the services of a trained entomologist.

"To obtain the most economical insect control, the trained entomologist should be working for and responsible to the growers," Mr. Siek said. He added, however, that the entomologist should work in close cooperation with commercial insecticide companies and extension and research personnel.

The speaker feels the hiring of an entomologist by one or more farmers will result in good insect control, and will enable the farmer to devote more attention to production phases which only he can handle.

Farmers were told to learn about the insects in their cotton, from seedling stage to harvest, and to be familiar with the type of injury each causes by Dr. J. N. Roney, Arizona extension entomologist. He participated in a discussion of a good insect control program and pay-off.

"If the farmer is not willing to learn about these insects, he should select a fieldman in whom he has faith," Dr. Roney said. "He should then let the fieldman check his field periodically and start controls when suggested."

Using hypothetical cases to illustrate his points, Dr. Roney said some farmers wait too long before starting control measures. Others are not familiar with insects, are overly anxious, and sometimes use too many insecticides.

To obtain a top pay-off crop, Dr. Roney said, a farmer must practice crop rotation, use pure seed, prepare a good seedbed, treat seed for diseases, fertilize properly, irrigate correctly, cultivate only when needed, and control insects.

The cotton industry is edging closer to controlling fruiting of cotton with chemicals, but a lot of research will be needed before the technique can reach the practical stage.

This was the belief expressed by Dr. H. R. Carns, plant physiologist, U.S. Department of Agriculture, Los Angeles, and Dr. V. T. Walhood, plant physiologist, U.S. Cotton Field Station, Shafter, Cal.

The physiologists pointed out that effects of growth regulators on cotton have been studied repeatedly since the early 1940's. In most cases, results have indicated such regulators offer little immediate promise of aiding in the control of fruiting.

"Scattered throughout the tests, however, are isolated cases where increased yields or altered flowering and fruiting patterns did occur," they stated. "It is by reason of such cases, in part at least, that further research on the chemical control of fruiting is warranted."

The scientists feel if more were known regarding the factors within the plant that control fruiting, the present narrow limits under which regulators are effective could possibly be widened sufficiently to make such applications more generally useful.

A chemical company representative told the conference that while it is unwise to pay too much for an insecticide, it is even worse to pay too little.

F. Mike Svoboda of White Chemical Co., Phoenix, represented the insecticide industry in a panel discussion of a good cotton insect control program and pay-off.

Pointing out that an insecticide contains active and inactive ingredients, Mr. Svoboda said both types of materials should be of high quality. The quality of carriers—the material with which the poison is mixed—can affect the efficiency of a farmer's insect control program.

"The best dusts you can buy will, in the long run, be your most economical material," he said. "Original cost of an insecticide means very little. What a material actually costs you can be determined only from knowing the value and benefit received from the degree of insect control in your fields."

A selective weed killer may help California farmers solve a $300 million problem.

Improved weed control methods in cotton were reported by Jim Hughes of Sunland Industries, Fresno, Cal. He told the group the $300 million annual loss to weeds in California represents more than the total yearly income from cotton, the state's leading cash crop.

Reporting on efforts to find a selective weed killer in cotton, Mr. Hughes said numerous field trials the last two years have shown annual weeds can be controlled with diuron after the last cultivation.

ATTENTION GETTER—The National Plant Food Institute's Fertilizer Salesman's Handbook is the focal point of a discussion between Dr. M. H. McVickar, California Spray-Chemical Corp.; Glenn Holt, U.S. Borax and Chemical Corp., and Dick South, Hansen & Peterson, during the Western Washington Fertilizer Dealers Meeting at Mt. Vernon, Wash.

Western Washington Dealers Briefed on Soil Tests; Forage, Tree Fertilization

MT. VERNON, WASH.—The capacity crowd which attended the third annual Western Washington Fertilizer Dealers meeting here was presented with facts and figures on forage and tree fertilization needs.

Dr. Walter P. Mortensen, soil scientist at Puyallup, stated that "nitrogen increased the percent of crude protein from 8.7 to 14.2 in orchard grass grown under irrigated conditions. Increased frequency of cutting resulted in increase in protein due to differences in stages of maturity."

Studies indicated that when nitrogen is used in reasonable quantities on irrigated pastures containing orchard grass that large quantities of plant nutrients are removed from the soil. Dr. Mortensen stated that under these conditions "only through continuing fertilization can high production be maintained."

Dr. Al Halvorson, extension specialist in soil testing, stressed the need for soil sampling to determine proper fertilizer needs. Dr. Halvorson stated that "soil testing is good for the farmer and good for the fertilizer dealer's business if he wishes to get in and promote its proper use." He cited several instances of fertilizer dealers who were doing an excellent job of backing Washington State College on its soil testing program. Dr. Halvorson's figures indicated that the large majority of soils tested in western Washington were low in the major nutrient elements.

Darrel Turner, outlying testing expert, outlined the need for more experimental studies in the field to check out the soil testing program. Mr. Turner stated "that correlation studies showed soil tests for phosphate and potash have correctly indicated the need 70% and 80% of the time, respectively. He urged the fertilizer dealers to come and visit demonstration plots and bring farmers with them.

Dr. S. P. Gessel, associate professor of forestry at the University of Washington, showed slides to indicate the excellent growth response he had obtained on application of commercial fertilizers to Douglas fir trees.

Dr. Gessel stated that "a tree is like any agronomic crop, it requires water and plant nutrients to make maximum production." He indicated that interest in forest fertilization by the large companies and small woodlot owners was increasing very rapidly, and that there would be a large number of fertilizer experiments going out in the Douglas fir region during the next few years. He stated that the fertilizer potential in this area was tremendous, but that much more research data is needed to establish economic levels.

F. Todd Tremblay, regional director of the National Plant Food Institute, emphasized the need for individual fertilizer dealers to become well acquainted with the research and demonstration work being carried on in their areas. Mr. Tremblay said, "If we are going to begin to realize the fertilizer potentials of our forage and tree crops, it will only be done by the cooperative effort of the fertilizer dealers and research and extension personnel in each area."

I. Nagatani and Bob Hulbert, area farmers, presented some interesting data on the economics of producing some of the most important cash crops in the area.

Rune Goranson, advertising executive from Seattle, talked about the importance of making the most of the advertising dollar. "Advertising at the dealer level should be timely and tie in with the over-all advertising of the dealers' supplier," Mr. Goranson stated.

Dr. Malcolm McVickar, chief agronomist for California Spray-Chemical Co., and banquet speaker at the meeting, stressed the need of selling the economic benefits of fertilizer use. Dr. McVickar stated that "the farmer is interested in knowing how much money he is going to realize per acre by the proper use of fertilizers. We have this kind of information and should make every effort to bring it to the attention of the farmer."

HELPFUL ACCIDENT

MIDLAND, TEXAS—Sometimes our most valuable lessons are learned by accident. Carl Leonard who farms 500 acres of irrigated cotton learned a lesson in fertilizers last year because he had carelessly left some irrigation pipe lying in the field. He had put on 200 lb. of 0-46-0 and one application of nitrogen before planting time. Then, when he put on a sidedressing of nitrogen, his field hands skipped the four rows where the pipe lay. "The field average was over a bale and a half per acre," Mr. Leonard said, "but that strip turned a sickly color and made only a fourth of a bale to the acre. It taught me that fertilizers must not only balance the amount of moisture but they must also balance one another." This year he is using 100 lb. of potash, 250 lb. of 0-46-0, and will put on 400 lb. of ammonium sulphate. This time there will be no skips—the nitrogen will be put on every acre.

Lime Sales

WASHINGTON—Lime sales for agricultural use during 1958 totaled 176,212 short tons, down from 221,973 short tons in 1957, the Bureau of Mines has reported. The 1958 figure included 56,613 short tons of quicklime and 119,599 short tons of hydrated lime.

ANSWERS

(Continued from page 1)

The intelligent use of pesticides in the South has made possible the area-wide control of the cattle tick, thus permitting the development of a profitable livestock industry.

Yellow fever spreading northward from south of our border constitutes a serious threat which can only be controlled by proper application of pest control chemicals to kill off the insect carriers.

The Public Health Service maintains a constant vigil against Bubonic plague, carried by mice and rats, the control of which requires the use of rodenticides as a sanitary measure.

When a pest assumes such economic importance that it must be controlled, or where the public health is threatened by disease-carrying insects, the industry assumes its responsibility of endeavoring to develop a pesticide chemical which will control the pest.

More than 30 different research activities go into the development of a pesticide chemical before it is offered to the public. These steps include, among others:

The synthesis of 300 to 2,000 compounds, preliminary biological screening, secondary biological screening, test compound for acute toxicity to animals and humans, preliminary testing for toxicity to plants, select 1 to 6 of the compounds, synthesize 25 to 100 lb. of each, start testing of compounds under field conditions, conduct chronic toxicity tests to animals and humans, make samplings of residues left on plants, do advanced field testing on many crops, in different parts of the country under different weather conditions and make analyses of residue left on plants.

Large sums are expended in determining the hazards, if any, to the men in the plant where the chemical is produced, to the persons applying the pesticide and to the effects on plant and animal life.

In addition to testing by the companies in their own laboratories, additional work is carried out in cooperation with the land grant colleges; various federal agencies such as the U.S. Department of Agriculture, the Department of Health, Education and Welfare (Savannah Laboratory, the Wenatchee Laboratory, etc.) and the Fish and Wildlife Service; private research institutions; medical colleges, etc. The amount of work and type of work vary with each compound in accordance with the various problems involved.

At the present time industry has more than 350 cooperative projects with the federal government, the various state colleges and with private scientific groups mentioned above.

After all this work is done, and before sale in interstate commerce, the products must be registered with USDA. In addition there are pesticide laws regulating sale in more than 40 states. Where residue on a food product is involved, the research work must be reviewed by the Food and Drug Administration and a safe tolerance or an exemption from tolerance established by them.

Pesticides are among the most thoroughly tested chemicals on the market today.

The cost of getting a new pesticide ready to market varies from $500,000 to $2,500,000, averaging $1,500,000 for each new product.

I have on the table reprints of "The Stages in the Development of a New Pesticide" which is a report of the Food Protection Committee of the National Research Council, National Academy of Sciences. I will be glad to give copies of this chart to anyone who would like to give it further study.

We have recently published a 64-page booklet titled Open Door to Plenty, which covers in detail the importance of the use of pesticides in our economy and which contains chapters pertaining to wildlife, forest pest control, and testing programs. Upon request, we would be glad to send you a copy. We would welcome your comments.

You, meeting here today, are particularly interested in wildlife. Today, pesticide chemicals are a modern tool which can greatly improve wildlife. It is a new field compared to agriculture, but it is one being rapidly developed.

The recent developments for control of the sea lamprey in the Great Lakes is an example of a pesticide's usefulness in wildlife management, and of the potential for not only improving but making possible a return of sport fishing and the fish industry in the Great Lakes.

The use of herbicides to improve game habitat is contributing to better food for ducks as well as for many other species of bird wildlife.

Scientific forestry techniques through the use of pesticides are not only preserving and improving our supply of valuable timbers but are making possible better wildlife management.

The industry is spending large sums on research in these fields in cooperation with conservation research organizations throughout the country.

Another example is the use of herbicides to improve deer browse. This is accomplished by spraying tall and dense stands of aspen, causing them to send out new shoots low enough for the deer to feed on.

The artificial creation by the use of herbicides of open areas makes possible an increase in rabbits, sharp-tailed grouse and other small forms of animal life.

Some pesticides are used to clear ponds of undesirable fish, allowing more rapid growth of desirable species. Others are used to rid ponds of algae, weeds, leeches and parasite-carrying snails without harm to desirable fish. Still others are used as chemical repellents to protect young trees and brush from wildlife damage.

Briefly we have a choice: The use of pesticides with some possible temporary damage to wildlife under certain conditions, or less foods at higher prices; healthy forests and beautiful shade trees, or their destruction; healthy livestock, or sickly, scrubby animals; a healthy population, or the existence, actual and potential, of malaria, yellow fever, sleeping sickness and other insect-borne diseases.

Now permit me to comment on an equally important subject. We are all interested in proper wildlife management. Many of my members are contributing substantial sums to the organizations interested in wildlife preservation. To many of us it has been very unfortunate that we have had so much unsubstantiated criticism of the use of pesticides by people who are unqualified on the subjects on which they speak.

We have reference to criticisms that aerial broadcasting of pesticide chemicals is more dangerous than radioactive fallout; that people are endangered by eating vegetables, fruit, meat or milk produced in areas that have been treated with pesticides; that broad area pest control programs are among man's worst biological blunders and will result in a greater extermination of wildlife than in all previous years of history; and that pest control programs are worse than a combination of deforestation, illegal shooting, drainage, drought and pollution. None of these extreme statements can be substantiated by competent authorities.

Such statements in the press can only create fear and conflict and result in a waste of energy for all interested in sound wildlife programs. If the same amount of energy were put on the scientific development of the facts, weighing the benefits against possible losses, far greater benefits would result to all interested parties and a constructive, coordinated program would be developed. The charges in many cases are so general, so broad and conflicting that it is difficult to determine their purposes or objectives.

Throughout the press many statements can be found criticizing the so-called mass application programs of pesticides. What is meant by a mass application? How is it defined? Does it mean a government program for an area, or an area where materials are applied by private individuals who must grow crops in order to feed the public?

Pesticides are criticized as a class. Why is no distinction made between the different chemicals with various toxicities, different application procedures, varying periods of effectiveness, etc.? Why is no consideration or recognition given to the interests of agriculture, forestry, public health and other interests and their relation to wildlife conservation?

Is it the objective of those promoting a fear campaign that all pesticides be banned from use? Are the people of New England willing to give up their elm trees and the bird cover furnished by them by not being able to control the Dutch Elm disease? Is the American public willing to eliminate the grasshopper program that annually saves millions of dollars worth of crops in 17 western states, thus laying open the danger of the grasshopper menace spreading to the east and other areas where local facilities are inadequate to handle the problem?

Charges have been made that the use of pesticides endangers public health. Are those who make these charges aware that the U.S. Public Health Service has conducted large scale population checks in several areas of the country and has been unable to find any harmful results that can even remotely be traced to pesticide applications? Are they acquainted with the work being done by the U.S. Public Health Service in their laboratories in Savannah, Georgia and Wenatchee, Washington and others?

We hear much about upsetting the balance of nature. Has nature ever been in balance? Even in the wildlife field do we not have to control certain forms of wildlife in order that more desirable forms may develop? A recent case in point was stated in the Federal Register for Jan. 31, 1959, and covered authorization by the Fish and Wildlife Service for killing common mergansers in western Washington State when they were found to be causing serious depredations upon the trout populations.

Lea S. Hitchner

On a more or less personal note, some of the conservation groups have accused the industry of lobbying for these programs. This we categorically deny. The programs are determined by competent scientists at the federal and state levels after careful studies of the problems involved.

We realize that there are extremists on both sides of any matter, but nothing is being gained by the continuation of a fear campaign. It is our hope that the wildlife problems can be solved and their relation to other segments of our economy can be worked out on a scientific basis and the interested groups can together develop a sound approach to the problems, realizing that in some instances some segments of our economy, including wildlife, will be temporarily affected.

The members of our industry and we in NAC will be glad to participate in any constructive programs.

SAFETY OF CONTROL PROGRAM CITED

MEMPHIS—N. H. Causey, state Plant Pest Control Division, told a Memphis civic club that Dieldrin has been tested extensively by agriculture, food, health and state organizations and that the chemical can kill warm blooded animals only under extreme and unusual conditions.

Local civic, garden and sportsmen's groups have raised objections to the Plant Pest Control Division's efforts to eradicate the white fringed beetle through widespread application of Dieldrin and DDT.

Mr. Causey said that only two complaints had been received in eight years of using the chemicals in the control program here. However, a storm protest broke several weeks ago after Harold Peters, biologist for the National Audubon Society, attacked the control program.

Speaking before the Memphis Rose Society, Mr. Causey swallowed several pellets of the chemical to prove that it is harmless. He said that his organization had hoped to treat all of Memphis in five years but these plans were disrupted because of a shortage of supplies and money. "And then came all these scare stories," he said, "and now I don't know if we'll ever get it done."

Utah Dealers Meet with U.S. Steel Officials

PROVO, UTAH—Fertilizer dealers and distributors from central and south Utah met here recently with officials of U.S. Steel's Coal Chemicals Sales Division.

The major theme of the meeting was that no commercial fertilizer dealer can effectively serve his farm customers without a full and detailed knowledge of his products and what they can do for various crops and soils.

Frank E. Adams, western manager of coal chemical sales for U.S. Steel, told the group, "Fertilizer dealers and farmers are both in business for the same reason . . . to make a reasonable profit. Both must keep up to date on the latest developments in their fields to stay ahead of rising costs for materials and labor."

Ozark-Mahoning Names District Representative

TULSA, OKLA.—Ozark-Mahoning Co., Tulsa, announced the appointment of H. E. (Cotton) Graham as district representative in the Iowa-Minnesota area.

Mr. Graham, who has had more than 10 years experience in the fertilizer industry, was formerly a member of the board of directors of both the Oklahoma and Arkansas Plant Food Education Societies.

Trade Winds From California

FOWLER, CAL. — Mirigian Bros. has been incorporated in Fowler to handle a general line of agricultural products. Principals in the firm include M. K., Arakel L., and Karekian K. Mirigian. The firm is capitalized at $250,000.

●

SANTA ROSA, CAL. — Green Mountain Gardens is the name of a new nursery supply store handling farm chemicals for home use. It is located in Calistoga north of here, and its owners are Thomas G. Eckart and Lois P. Gryson.

●

MT. EDEN, CAL. — Two related firms have been incorporated to deal in farm chemicals and related products. The California - Florida Plant Corp. has a valuation of $100,000, and the Fremont Greenhouse Corp., in Fremont, is capitalized at $500,000. Principals in both firms include Harry G. Harper of Menlo Park, Clifford M. Luce and Stuart, Florida, and Yoshima Shibata, all of Fremont.

●

MENLO PARK, CAL. — Garden and home supplies are now being retailed by the recently founded Gardenmart Corp. here. Owners of the firm include the Grayson W. Hinckley's, father and son, and Robert S. Hinckley.

●

SAN JOSE, CAL.—Braden's Nursery and Landscaping is the name of a new retail firm at 11135 S. Sunnyvale-Saratoga Rd., San Jose. Owners are Gordon R. and Marion L. Braden.

●

HANFORD, CAL. — The Loftis Flying Service of Hanford is now the Loftis Flying Service, Inc., with a capitalization of $50,000. The crop dusting firm is owned chiefly by Frank Loftis and William Stanahan.

●

EDISON, CAL.—The Grozawl Fertilizer and Soil Conditioner Co. has been formed in Edison to market a new product under the name of Grozawl as an incentive to crop growth. Calvin N. Cox and Colin M. McNabb are the principals in the firm preparing to distribute the product.

●

OAKLAND, CAL. — Carl's Crestmont Nursery has been opened at 11883 Skyline Blvd., Oakland, to retail agricultural chemicals for home gardeners and other nursery products. Owner is Carl A. Anderson.

●

SANTA CRUZ, CAL.—Robert E. Burton has opened a farm and garden supply store in Santa Cruz at 1187 Prospect Heights.

Plant Pathologist Retires

TRENTON, N.J. — The retirement of Edgar G. Rex, chief, Bureau of Plant Pathology, New Jersey Department of Agriculture has been announced by Michael J. Klein, president, State Board of Agriculture. Mr. Rex had served on the department staff for a total of 34 years. He takes up new duties as executive secretary of the New Jersey Federation of Shade Tree Commissions and will maintain an office at Rutgers University.

He has served as president of the northeastern division of the American Phytopathological Society, president of the New Jersey Federation of Shade Tree Commissions, and chairman of the Northeastern Forest Pest Council.

Aerial Spraying School Started in Nevada

MINDEN, NEV. — To meet the needs of the growing industry, the Agricultural Aviation Institute has been established here to train pilots to become aerial crop dusters and sprayers.

Located about 14 miles from Lake Tahoe in the high Sierras, the Turbo Dynamics Corp. subsidiary is headed by Murray A. Kahn and Martin Kronberg, veterans in the aviation field.

Mr. Kahn is director of the corporation's national aviation operation, and Mr. Kronberg is chief of flight operations and director of training of the agricultural school.

The school's curriculum includes all phases of aviation agriculture such as plant disease control, seeding and fertilizing, defoliating and desiccating, weed and brush control, insect control, planning and operation, safe handling of chemicals and application, pattern measurements, calibration of equipment, airplane care, servicing techniques, laws and regulations, customer relationships and other related subjects.

The flying operation is done at Douglas-Tahoe Airport, Minden. Portions of the field are marked off and adjusted for simulated swath runs as in the actual dusting and spraying operations. All types of agricultural aircraft are used for diversification in pilot techniques. Approximately 32 hours of instruction is given in maneuvers such as swath runs, computations, mapping, take-offs, climb-outs, forced landings, emergencies, slow flight, power turns, flat turns, vertical reversements, survey of fields, "S" turns, dusting, spraying, fertilizing and seeding.

Students are being recruited from all parts of the world; in connection with the school's activity, free housing is arranged for students at the corporation's own Minden Inn Hotel, a few miles from the airport.

The Agricultural Aviation Institute courses are of the resident and correspondence types, for those who cannot attend flight training. A non-flight course is offered in the ground phases only.

The duration of the flight and ground course takes approximately 30 to 45 days. Qualifications for acceptance are a commercial pilot's license and 500 solo hours.

Upon successful completion of the course, students are awarded a "Certificate of Accomplishment" and are qualified to take their state examination as aerial applicators. A free placement service is also available to place graduates in jobs all over the world.

Croplife *Want Ads... Get Results*

FORMULATORS,

Are you looking for...

- ✓ High Flash
- ✓ Direct Unit-Produced Uniformity
- ✓ Non-Phytotoxic
- ✓ High Solvency
- ✓ High Purity
- ✓ Proven Diluent

The Answer: **ESPESOL 1**

Under conditions where high flash is desirable, you will find Espesol 1 an ideal diluent. High aromatic content assures high solvency power and because Espesol 1 is a direct unit-produced solvent rather than a blended product, formulators know they can depend on consistent uniformity, run after run.

Tested and approved by government and college experiment and extension facilities, Espesol 1 is non-phytotoxic and offers a fast evaporation rate because of its narrow boiling range. For a proven, high-flash diluent, specify Espesol 1!

Available on short notice delivery from all of Eastern States' terminal facilities, Espesol 1 can be ordered in drum, transport, tank car, barge and ship tank lots.

Mail coupon below for complete information.

EASTERN STATES PETROLEUM & CHEMICAL *Corporation*

(Formerly Eastern States Chemical Corporation)
P.O. Box 5008, Houston 12, Texas, Phone Walnut 3-1651
Chicago Office: Phone Village 8-5410
New York Office: Phone Circle 7-2520
Cleveland Office: Phone Edison 3-0188
Louisville Office: Phone Juniper 3-7634
Atlanta Office: Phone Cedar 3-3227
Los Angeles Office: Phone Ryan 1-0278

Eastern States Petroleum & Chemical Corporation
P. O. Box 5008. Dept. CL-3-99, Houston 12, Texas

Please send me free booklet on the characteristics and properties of insecticide solvents.

NAME_____
FIRM_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

U. S. TERMINALS: Houston, Texas; Chicago, Illinois; East Liverpool, Ohio; Madison, Indiana; Brownsville, Texas; Savannah, Georgia; Carteret, New Jersey; Los Angeles, California

EUROPEAN TERMINALS: Dordrecht (Rotterdam), Netherlands; Antwerp, Belgium; Ludwigshafen, Germany; Livorno (Leghorn), Italy

WILDLIFE

(Continued from page 1)

improves timber but also makes possible "better wildlife management."

"Some pesticides are used to clear ponds of undesirable fish, allowing more rapid growth of desirable species," he said. "Other pesticides are used to rid ponds of algae, weeds, leeches and parasite-carrying snails, without harm to desirable fish."

He expressed the hope that the chemical industry and other groups, agencies and institutions interested in advancing programs for wildlife protection and propagation could cooperate more fully in the development of a "constructive, coordinated program" with increasing emphasis on scientific research.

Mr. Hitchner denied the accuracy of what he termed criticisms of the aerial spraying of pesticide chemicals. Statements to the effect that aerial spraying would "result in a greater extermination of wildlife than in all previous years of history," and "pest control programs are worse than a combination of deforestation, illegal shooting, drainage, drouth and pollution," were given as examples.

He said that no such "extreme statements can be substantiated by competent authorities."

Mr. Hitchner asked his audience to weigh the over-all responsibilities of the chemical industry to develop, manufacture and distribute the pesticides essential to production of the nation's food supplies, and to the control of malaria, yellow fever and numerous other insect-borne diseases of mankind.

The chemical industry, he emphasized, seeks to meet this responsibility while at the same time maintaining and improving educational programs for the safe use of its products. The foundation for such programs, he said, is continuous research and testing—at all stages of development—of the chemicals used.

As to charges that use of pesticides endangers public health, Mr. Hitchner said large-scale population checks in several areas of the country by the U.S. Public Health Service have failed to find "any harmful results."

The chemical industry was said to be expending large sums of money "to determine the hazards, if any, to the men in the plant where the chemical is produced, to the persons applying the pesticide, and to the effects on plant and animal life."

In addition to the testing by individual companies in their own laboratories, said Mr. Hitchner, additional work is carried on by industry in cooperation with federal agencies such as the U.S. Department of Agriculture, Department of Health, Education, and Welfare, and the U.S. Fish and Wildlife Service; with the several land grant colleges and universities and other institutions of higher learning, and with various private scientific institutions and organizations. In all of these areas, industry has more than 350 cooperative projects, he reported.

Appearing on the panel in addition to Mr. Hitchner were speakers representing the U.S. Department of Agriculture; U.S. Fish and Wildlife Service; the Alabama Wildlife Federation; and a physician.

Charles D. Kelley, secretary of the Alabama Wildlife Federation, termed the USDA program to eradicate the imported fire ant as being "ill-advised, hastily conceived, poorly planned and a glaring example of riding rough-shod over the responsibilities of other public and private agencies. From its conception the program has been one of exaggerations and misrepresentations, combined with the deliberate withholding of known facts."

C. H. Hoffman, Entomology Research Division of USDA, recommended the increased use of parasites and predators in the biological control of various pests, pointing out a number of examples in different parts of the world where such programs have been successful.

He cited the control of Klamath weed through the importation of several species of insects from Australia and Europe which feed on this plant and keep it under control. The speaker also mentioned the value of breeding insect-and-disease-resistant plants, and the application of irradiation via gamma rays to kill screwworm flies.

L. F. Curl, assistant director, Plant Pest Control Division, USDA, discussed policies and methods in use of chemical pesticides by his division and its cooperators. He said that despite assertions to the contrary, "a great deal of very fine and worthwhile research work had been done on the imported fire ant before the eradication effort got under way . . . From research and our methods improvement activities and from experience with previous soil-infesting pests, a number of things were learned which are being utilized on the imported fire ant program." These matters include better application methods, exercising care not to allow pesticides to be applied to ponds and streams, preventing drainage of toxicants into streams, and treating areas of infestation progressively to protect the wildlife of the area as a whole.

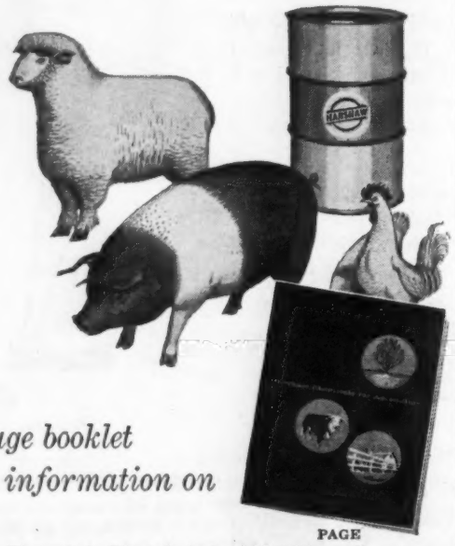
Walter W. Dykstra, U.S. Fish and Wildlife Service, expressed fear that although fish, birds and mammals may not succumb directly from pesticides applied in their habitat, certain less obvious effects may still be significant. "For example," he said, "laboratory tests have revealed that some of the chlorinated hydrocarbon insecticides adversely affect reproduction and also bring about increased mortality of the young. Prolonged exposure to a residual pesticide may contribute to weakened physical condition and the animal may then be more susceptible to mortality through disease and predation.

"These factors, plus reduced availability of food chain organisms resulting from pesticide applications, serve to make chronic effects on wildlife extremely difficult to measure. The adverse influence may be particularly significant in the case of chemicals which persist in the soil for prolonged periods where their residual effects could prove more detrimental than their initial influence."

REMEMBER TO ORDER
CHASE BAGS
There's None Better!

cobalt
AGRICULTURAL CHEMICALS

for prompt shipment
Cobalt Carbonate
Cobalt Sulfate
Cobalt Sulfate Monohydrate
Cobalt Nitrate
Cobalt Chloride



write
for this 24 page booklet furnishing information on

	PAGE
Essential Trace Elements in Plant & Animal Nutrition	5
Trace Mineral Compounds	9
Fungicides	12
Weed Killers	14
Miscellaneous Agricultural Compounds	15
Available Literature	16
Supplementary Reading	16

THE HARSHAW CHEMICAL co.
CLEVELAND 6, OHIO
Chicago • Cincinnati • Cleveland • Detroit • Hastings-On-Hudson
Houston • Los Angeles • Philadelphia • Pittsburgh

Grasshoppers Infest 3 Million Texas Acres

COLLEGE STATION, TEXAS — Grasshoppers have infested 3,460,000 acres in Texas, reported Texas agricultural extension service entomologists here. The heaviest infestations were found in the two northern tiers of counties in the Panhandle and those along the Oklahoma line on the eastern side of the area.

In the south plains area, only spotted infestations were found by the surveyors. The infestation in the north central area was listed as light and these counties primarily are located adjacent to and including the Red River Valley from Childress eastward to Grayson. Other light infestations were noted in McLennan, Coryell and Lampasas counties in central Texas and in the river bottomlands of Johnson, Ellis and Navarro Counties.

Sulfur-Clover Combination Seen As Rangeland Hope

SACRAMENTO—A combination of sulfur and dryland clovers, in addition to such techniques as brush clearing and phosphate fertilizing where needed, offers a bright hope of large scale future rangeland development in California, according to researchers.

Since sulfur often is deficient on unirrigated rangelands and is most easily and cheaply corrected on legumes, its use as a fertilizer shows promise on the many thousands of California foothills which have been or may be improved by seeding clover.

W. A. Williams of the University of California cites one convincing experiment in which rose clover was seeded and production doubled on one range. The following year the land was fertilized with sulfur and as much increase was realized again.

In forecasting impressive rangeland development through use of this chemical which a decade ago received little attention from agriculturalists, Mr. Williams said that 200 to 400 lb. of gypsum an acre, costing from $3 to $5 would produce results. Gypsum is one of the best sources of agricultural sulfur.

Sulfur deficiency in California soils is widespread. A survey by W. E. Martin, agricultural extension service soils specialist, showed crop responses to sulfur in 242 localities scattered throughout 34 counties, mostly north of the Tehachapi Mountains. But to the frustration of the scientists working on the problem, there apparently is little pattern to the deficiency.

Lack of sulfur is unknown in arid regions where rainfall is insufficient to leach the natural supply from the soil and also on irrigated crops where the water supply contains appreciable sulfur. But elsewhere, even in areas of high rainfall and low sulfur content of rivers, the deficiency recurs in puzzling patterns. One field may show a response while another remains unaffected. The soil type seems to make little difference.

CALSPRAY

(Continued from page 1)

nounced that the Chemical and Industrial Corp., Cincinnati, would build both the nitric acid plant and the ammonium nitrate plant, two of the major facilities in the Kennewick operation.

Actual cost figures for the two installations were not immediately available but total cost is believed to be in the region of two million dollars.

Calspray's Kennewick plant will manufacture the Ortho line of ammonium nitrate, ammonium nitrate solutions, and high analysis nitric phosphate complex plant foods. Expected to be in operation by the end of 1959, the plant will supply the company's Pacific Northwest and Rocky Mountain distributors.

According to L. R. Jones, resident engineer in charge of the Calspray project, preparation for construction is proceeding on schedule. The construction engineer for the Chemical and Industrial Corp. has already arrived on the site.

SOUTH DAKOTA MEETING

BROOKINGS, S.D.—Some of South Dakota's top authorities in insect and pest control work will appear on the program at the 12th annual weed and pest control conference in Mitchell, March 17-18. The conference will also feature a chemical and equipment display.

New Soil Testing Program Discussed at Montana Plant Food Association Meeting

GREAT FALLS, MONT.—"Increased emphasis will be placed on pushing soil testing in Montana," stated Bernard L. Brown, Montana State College extension soils specialist at a recent meeting of the Montana Plant Food Assn. at Great Falls.

"The soil testing facilities have been moved to the agronomy and soils department under the direct supervision of Dr. Murray Klages," Mr. Brown continued. Standard soil tests to be run include pH, conductivity, phosphate, lime and texture. Potash will be run if requested for a small additional fee.

"In view of the increased interest in the potash test it may very soon be run as a routine analysis," Mr. Brown said.

John Reuss, assistant in soils, discussed the native hay fertility experiments he had carried out in cooperation with H. A. Kittams and Dr. Klages. The plots were strategically located in 12 different locations in western Montana. Substantial yield increases were obtained by use of fertilizer at 11 of the 12 sites. Nitrogen applications at the rates of 50 and 100 lb. of actual nitrogen resulted in the greatest economical returns.

"As a general rule, where the rate of phosphate was increased, the phosphorus content of the forage increased," Mr. Reuss stated. "The species composition influenced to a large degree the response from fertilizers. Stands containing a large percentage of grass responded best to the nitrogen applications. Grass-legume stands, where the soil supply of phosphate was low, responded best to nitrogen and phosphate used together." Financial assistance for these studies was provided by the National Plant Food Institute.

Harold Houlton, assistant in soils at the North Montana branch station, discussed its experience with fertilizers in the triangle area. Mr. Houlton said, "Fertilizer responses in the area were determined in large measure by the soil moisture conditions."

F. Todd Tremblay, regional director of the NPFI, discussed the position of the fertilizer dealer in modern day agriculture.

"During the last few years the fertilizer industry has made rapid advances in production methods, types of products produced, methods of delivery and methods of application. This change has made fertilizers an essential production item for the efficient farmer. It is up to the fertilizer dealer to keep up with modern fertilizer trends in distribution and know how or someone else who does keep pace will take over the business," Mr. Tremblay said.

Dr. J. C. Hide, professor of soils at Montana State College, moderated the session which was held in conjunction with the annual meeting of the Montana Plant Food Assn.

Newly elected officers for the Montana Plant Food Assn. included George Mason, president; Tom Selstad, vice president, and Warren Stensland, secretary-treasurer.

California Fertilizer Booklet Published

SAN FRANCISCO — The National Plant Food Institute and the California Fertilizer Assn., with the assistance of the University of California, jointly have published a 20-page booklet for banks and other lending agencies in California entitled, "More Profit from Fertile Soils in California."

The booklet emphasizes that "scientific farming is a must" for the modern farmer. Liberally and attractively illustrated examples are shown of what fertilizer can mean in terms of farm profits. The booklet also emphasizes companion production practices needed to get the most from fertilizer.

The booklet states that "on the average, California farmers use about 50% of the fertilizer recommended for top profit," and that "farmers, and banks servicing agricultural areas have, in fertilizer, a marvelous tool at their disposal for creating wealth."

Dr. Paul F. Sharp, director of the agricultural experiment station, College of Agriculture, University of California, in appraising the brochure said, ". . . it is a commendable effort to acquaint California agriculture with the significance of some of the findings related to the proper use of fertilizers." The economic data in the brochure was provided by the university.

The publication is being distributed to California banks and other lending agencies, farm advisors and agricultural specialists.

CALIFORNIA BILL

SACRAMENTO—Applicants for a California certificate of qualification in agricultural aircraft pest control would be required to serve a one-year apprenticeship period under terms of a bill introduced in the California Legislature by Assemblyman Lloyd Lowrey of Rumsey. The bill also deletes a provision from present law that apprentice experience may include operation of aircraft for application of seed and fertilizers to meet requirements for the certificate of qualification.

PEST CONTROL LICENSE

SACRAMENTO — Assemblyman Lloyd Lowrey of Rumsey has introduced a bill requiring the California Director of Agriculture to suspend the license of any pest control operator upon receiving a copy of a judgment and a certificate of facts indicating that an operator has failed for a period of 30 days to satisfy a final judgment.

Sacramento Insect Fighters Plan Light Trap Study

SACRAMENTO — Light traps will be employed by the Sacramento-Yolo Mosquito Abatement District in the western foothills of Yolo County to determine the flight patterns of the insects.

One of the aims of the study is to determine if the flight range of the Culex tarsalis and the Anopheles mosquitoes is greater than entomologists believe. It also will help the district decide if it is feasible to spend for control in the county when there is a possibility that the pests are flying in from outside areas.

Charters Issued

BATON ROUGE, LA.—As of Feb. 20, the Louisiana secretary of state's office has issued the following charters of incorporation: Davis and Humble Service, Inc., highway 19, Zachary, agricultural products, $25,000, and Chemical Squeeze, Inc., Lafayette, chemical control, $100,000.

You'll get a better understanding of the fertilizer market from this valuable new book

Crop-Use Patterns of Fertilizer in the United States

by

J. R. ADAMS L. B. NELSON D. B. IBACH

U.S. DEPARTMENT OF AGRICULTURE

This significant report was compiled by the U.S. Department of Agriculture after thorough studies of fertilizer use in the United States. Crop-Use Patterns covers questions which, until now, have not been adequately answered. Crop-Use Patterns is based on information gathered from every fifth farm surveyed in the most recent U.S. Census . . . providing a broad base of national information.

Some of the questions answered are:

what portions of croplands receive fertilizer
how fertilizer is used among major crops
how much acreage for each crop is fertilized

Specific fertilizer uses analyzed are:

Corn Tobacco Wheat
Oats Cotton Potatoes
All Crops and Cropland Pasture
Hay and Cropland Pasture

All graphically presented with 33 maps and numerous charts.

You'll want your own personal copy of Crop-Use Patterns. And you'll want to keep it handy where you can easily refer to its wealth of practical information about the use of fertilizer.

To obtain your copy of Crop-Use Patterns, fill in and mail the coupon below . . . the supply is limited.

Only $2.00 Order Today

Croplife 2501 Wayzata Blvd. Minneapolis 40, Minn.

Please send ..... copy(ies) of Crop-Use Patterns of Fertilizer in the United States

$2.00 per copy

Name .....

Address .....

City ..... Zone .....

State .....

Croplife®

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Western states.

TELL 'EM, SELL 'EM . . .

Plant Food Institute Tackles Problems of Communication Between Industry, Farmer

THE GAP between stores of knowledge held by agronomists and fertilizer researchers in the universities and in industry and the users of plant food products has long been a subject of concern on the part of the industry. One would think that with all of the effort expended to get information down to the grass roots level, there should be no problem. But there always has been, and the situation will probably continue for some time.

Applied research and technology in fertilizer manufacturing and use fulfill their purposes only when such knowledge is put to work on the farm. It results in increased yields, lower production costs, greater net profits and better living.

Dr. Richard Bahme, National Plant Food Institute, told the recent Arizona fertilizer conference that it is the job of everyone in the industry to aid this technology in "getting into common practice; thus increasing farmers' disposable income which contributes to the prosperity of all.

"I believe the groups which have the greatest opportunity to accomplish this job are the farm chemical dealers (salesmen) and county agents or agricultural extension service," he said. "They need to use the best educational information and techniques available. The county agents and dealer-salesmen are known to be most often in close contact with farmers. They are the most readily available sources of information to farmers and should coordinate their efforts in order to gain more rapid acceptance of applied research."

★ ★ ★ ★

PERHAPS the most thorough-going handbook ever published for fertilizer salesmen has been published recently by the National Plant Food Institute. Bringing together between its two covers the best of information gathered from many quarters, the book presents these facts in a logical, easy-to-comprehend manner.

Fertilizer industry leaders applaud the volume and state that its six chapters contain type of information which, if used well, could increase fertilizer consumption signifi:antly. They point out that the basic message contained in the handbook is not complicated, but embodies a punchy sales message. Its chapter titles tell the story:

Knowing Your Customer; Knowing Your Product; Economics Furnishes Sales Points; Useful Facts and Figures; Terms and Definitions; and Sources of Information and Other Aids to Selling. Even a person knowing little about fertilizers and their value could obtain a rather liberal education on the subject by perusing its pages.

Expressing the keynote of the book, Dr. Russell Coleman, executive vice president of the Institute, points out in the introduction that farmers should be using at least twice as much fertilizer as they are presently consuming; but at the same time, those who produce and sell plant food could furnish a lot more than farmers are presently buying.

Why is this? Dr. Coleman asks. The answer is, the customer doesn't understand.

The farmer doesn't know how to buy and apply fertilizer properly. He thinks he can't afford to apply fertilizer at recommended rates and if he should, he fears that he won't get his investment back. Maybe there won't be enough moisture . . . the fertilizer might burn up his crop. He might put on more than he needs and the extra amount will be wasted.

The farmer is more likely to attribute increased profits to a chance factor such as a "good year" than to proper fertilization, good seed, weed and insect control, good tillage practices or other practices over which he personally has control.

"These are barriers to proper fertilizer use," Dr. Coleman submits. "They must be broken down if we are to sell the amount of fertilizers that farmers need. The fact that they are so strong means only one thing . . . We haven't been communicating with our customers. At least, they haven't got the point. And if that is true, we haven't been putting it over too well.

"The twin pillars of successful selling are understanding the customer, knowing the product, and of course the other requirements such as willingness to work hard, friendliness and understanding the customer service."

Even if a person may lack some of these personal characteristics, Dr. Coleman indicated, the fertilizer salesman can learn about his customer and his product. That is what the handbook is about, he declares.

It would be difficult to pick out any single chapter or portion of the handbook and say that it epitomizes the general theme. However, the chapter on "Knowing Your Product" contains a major volume of information on the characteristics of fertilizers, their functions and compositions, how "grades" are designated, and the sources of major plant food elements.

The Case for Pesticides Presented by NAC Assn.

A MASTERFUL summation of the pesticide industry's position in the current conflict between its objectives and those of critics who would halt the use of pesticides on nearly every front was presented by Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Assn. in his recent talk before the National Wildlife Assn. in New York.

Mr. Hitchner's text, published in full elsewhere in this issue of Croplife, should be saved by readers as a fact sheet for future reference. It contains the most logical, sensible, thought-provoking collection of information on this topic that we have ever seen assembled in one place. It should form the basis for talks before local groups; letters to newspaper editors, and for conversation with those who are confused about what to believe after hearing that pesticides are the cause of illness and wildlife destruction. Furthermore, the points made are good just for one's own information.

We heartily endorse the case presented by the NAC secretary as being both sound and convincing. His calm approach to the problem was in marked contrast to emotional and totally exaggerated declamations frequently heard in criticism of pesticides.

Croplife's Home Office

Croplife

BPA — *Member of Business Publications Audit*

NBP — *Member of National Business Publications*

CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price, 25¢.

LAWRENCE A. LONG
Editor

DONALD NETH
Managing Editor

EDITORIAL STAFF — John Cipperly, Washington Correspondent; George E. Swarbreck, Canadian and Overseas Editor; Emmet J. Hoffman, Marketing Editor; James L. Engfer, Editorial Assistant.

ADVERTISING STAFF—Wilfred E. Lingren, Advertising Director; Carl R. Vetter, Advertising Department Manager; Bruce A. Kirkpatrick, Advertising Production Manager; R. Dale Swenson, Promotion Manager.

BUSINESS STAFF—Martin E. Newell, Chairman of the Board of Directors; Milton B. Kihlstrum, President and Treasurer; Wilfred E. Lingren, Executive Vice President; Don E. Rogers, Vice President; Paul L. Dittemore, Vice President; Donald Neth, Secretary; T. A. Gaden, Circulation Manager; James G. Pattridge, Assistant Treasurer; Richard Ostlund, Office Manager; Walter O. Buchkosky, Production Superintendent.

BRANCH OFFICES

EASTERN STATES—Paul L. Dittemore, Manager; James W. Miller and George W. Potts, Advertising Sales Representatives; Suite 3214, 551 Fifth Ave., New York 17, N.Y. (Tel. Murray Hill 2-2185).

CENTRAL STATES—Don E. Rogers, Manager; Henry S. French, Assistant Manager; Amos W. Standish, Advertising Sales Representative; 2832 Board of Trade Bldg., 141 W. Jackson Blvd., Chicago 4, Ill. (Tel. Harrison 7-05/5).

SOUTHWEST—Martin E. Newell, Manager; Thomas E. Letch, Assistant Manager; 612 Board of Trade Bldg., Kansas City 5, Mo. (Tel. Victor 2-1350).

NORTHWEST—Paul A. Anderson, Advertising Sales Representative, P.O. Box 67, Minneapolis 40, Minn. (Tel. Franklin 4-5200).

WASHINGTON CORRESPONDENT — John Cipperly, 604 Hibbs Bldg., Washington, D. C. (Tel. Republic 7-8534).

EXECUTIVE AND EDITORIAL OFFICES — 2501 Wayzata Blvd., Minneapolis, Minn. Tel. Franklin 4-5200. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by
THE MILLER PUBLISHING CO.
2501 Wayzata Blvd., Minneapolis, Minn.
(Address Mail to P. O. Box 67, Minneapolis 40, Minn.)

Associated Publications—The Northwestern Miller, The American Baker, Farm Store Merchandising, Feedstuffs, Milling Production.

MEETING MEMOS

March 24-25—National Plant Food Institute Forest Fertilization Research Advisory Committee meeting, Atlanta, Ga.

Aug. 3-7—Gordon Research Conference on biochemistry in agriculture, Kimball Union Academy, Meriden, N.H.

Meeting Memos listed above are being listed in this department this week for the first time.

March 17—Western Agricultural Chemicals Assn. spring meeting, Hotel Miramar, Santa Barbara, Cal. C. O. Barnard, executive secretary.

March 19-20—Oregon Feed and Seed Dealers Assn., annual convention, Multnomah Hotel, Portland, Ore.

March 25-27—North Central Branch, Entomological Society of America, Annual Meeting, Neil House Hotel, Columbus, Ohio, C. W. Wingo, 102 Whitten Hall, University of Missouri, Columbia, Secretary-Treasurer.

April 1-3—Twenty-fourth Annual Chemurgic Conference, Congress Hotel, Chicago, Ill.

April 8-11—Symposium on forest soils, Louisiana State University, Baton Rouge, La.

April 29-30 — Symposium on transportation, regulation and packaging of chemical products, sponsored by the Manufacturing Chemists' Assn., Engineering and Scientific Center, Cleveland, Ohio.

June 9-10—Seventeenth Annual Convention of the Association of Southern Feed and Fertilizer Control Officials, Velda Rose Motel, Hot Springs, Ark.; Maurice Rowe, Virginia Department of Agriculture, 1122 State Office Bldg., Richmond 19, Va.

June 14-17—National Plant Food Institute, Annual Convention, the Greenbrier, White Sulphur Springs, W. Va.

June 29-30—Seventh Annual California Fertilizer Conference, University of California campus, Davis, Cal. J. H. Nelson and Earl R. Mog, co-chairmen.

July 7-9—Regional Fertilizer Conference, co-sponsored by the Pacific Northwest Plant Food Assn. and state colleges and universities in the area, Winthrop Hotel, Tacoma, Wash.

July 29—Annual Kentucky Fertilizer Conference, Guignol Theater, University of Kentucky campus, Lexington, Ky.

Oct. 14-16—Pacific Northwest Plant Food Assn. Annual Convention, Chinook Hotel, Yakima, Wash.

Oct. 21-23 — National Agricultural Chemicals Assn., 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind., Lea S. Hitchner, executive secretary.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C. Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 9-11 — California Fertilizer Assn., 36th annual convention, Fairmont Hotel, San Francisco.

Nov. 16-20 — National Aviation Trades Assn., 20th annual convention, New Orleans, La.

Dec. 9-11—International Crop Protection and Pest Control Exhibition, Seymour Hall, St. Marylebone, London, England.

California Scientists Find 2 Nematode Diseases

BERKELEY, CAL. — Two important nematode-caused diseases affecting California crops have been discovered by scientists at the University of California, Riverside.

Involved are the sheath nematode on citrus trees and the root-lesion nematode on cymbidium orchids.

The root-lesion nematode disease of cymbidium orchids is widespread in southern California and has not been recognized until now as the cause of an extensive root and bulb rot disease of this important commercial plant, according to S. A. Sher, vice chairman of the department of plant nematology, Riverside.

Mr. Sher's studies have shown that the "Pratylenchus scribneri" nematode is the cause of the orchid disease.

The new citrus nematode disease has been found only in Coachella Valley in eastern Riverside County, reports S. D. Van Gundy, assistant nematologist. It is causing galls on citrus trees there.

NEW PERSONNEL

FAYETTEVILLE, ARK.—The appointment of new personnel of the University of Arkansas' Agricultural Experiment Station was announced by Lippert S. Ellis, dean and director of the college of agriculture and home economics. The new staff members are replacements for people who resigned the past year, the dean said. Roy W. Haggard has joined the agronomy staff as research assistant, replacing John P. Thomas who resigned in September. He is assisting with research on cotton and genetics and breeding. In entomology, Robert L. Watson replaces Robert L. Harris as research assistant. He is continuing research on horn fly and other insects that affect livestock.

CALENDAR FOR 1959-60

MARCH

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

APRIL

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

MAY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JULY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

AUGUST

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

SEPTEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

OCTOBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

DECEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JANUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

Disease Control Highlight Of Prune Day Meeting

DAVIS, CAL.—Chemical control of diseases to prunes was a leading subject for discussion at the annual Prune Day held on the Davis campus of the University of California recently. The prune growers heard several reports from university researchers.

Joseph Ogawa reported on two organisms that cause brown rot loss on stone fruits in California. A control is available for one but not for the other, he said. Since both are found about equally on prunes, no control is yet effective as far as prunes are concerned.

Bacterial canker is giving up some information to the university's "team" effort, but no control answers are yet known, it was stated. Canker formation is generally greater on very young trees. Fewer cankers were formed on grafts on Lovell peach roots than on Myrobalan plum stock, and fewer cankers were formed after two fall sprays of Bordeaux mixture and of Endothol. Also, soil fumigations of D-D and of chloropicrin gave some reduction, according to reports. But it was said the disease is a complex one, and the above results are from only a single year of work.

The work of W. H. Griggs on the relation of climate to fruit set indicated that the low 1958 prune crop was due to very few temperature-hours over the 60° level. Temperatures over this level are necessary for several days to complete the fertilization process. Water and soil management appeared to be the key to the small prune problem in the lower Santa Clara Valley area, according to John J. Smith and Leon Tichinin.

To Process Uranium Dioxide

KANSAS CITY, MO.—Plans to construct a plant to process uranium dioxide for nuclear fuel use were announced by Spencer Chemical Co. The new plant will be erected at the company's Jayhawk Works near Pittsburg, Kansas, and will be able to process approximately 50 tons of uranium dioxide a year.

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge $2.25. Situations wanted, 10¢ a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $11 per column inch.

All Want Ads cash with order.

HELP WANTED

EXPERIENCED SALESMAN FOR AGRI-cultural sales Northeast territory. Send background resume with recent photograph. Address Ad No. 4603, Croplife, Minneapolis 40, Minn.

MONSANTO IS SEEKING EXPERIENCED (3-10 years) fertilizer salesman for Illinois-Wisconsin-Iowa area. Starting salary commensurate with experience, plus car and expenses. Send all replies in confidence to William R. Hayes, Monsanto Chemical Co., St. Louis, Mo.

FERTILIZER SALES MANAGER — ES-tablished multi-plant fertilizer company, central states area, wishes to employ man 30 to 45 who has fertilizer sales experience for position of plant sales manager. Send background resume with recent photograph. All information confidential. Address Ad No. 4501, Croplife, Minneapolis 40, Minn.

MISCELLANEOUS

BRUSH AND WEED KILLER

KILL SUBMERSED water weeds which foul up motor propellers, tangle fishing gear and choke irrigation ditches with R-H Granular Weed Rhap. Inexpensive, easy to use, sure results. For details write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

KILL BRUSH at low cost with amazing R-H Brush Rhap. Will not injure grasses, grains, cattle, or other animals. See your dealer, or write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

INDEX OF ADVERTISERS

The index of advertisers is provided as a service to readers and advertisers. The publisher does not assume any liability for errors or omissions.

Abrasion & Corrosion Eng. 13
Allied Chemical Corp., Nitrogen Div. ....
Amchem Products, Inc. .....
American Potash & Chemical Corp. .....
American Potash Institute .....
Arcadia Pump Mfg. Co. 8
Armour Fertilizer Works .....
Ashcraft-Wilkinson Co. .....

Baker, H. J. .....
Baughman Manufacturing Co., Inc. .....
Bemis Bro. Bag Co. 7
Blue, John, Co. .....
Bradley & Baker .....
Broyhill Company, The 15
Burgess Publishing Co. .....

Chantland Mfg. Co. .....
Chase Bag Co. 20
Chemagro Corp. .....
Chemical Eng. Serv. Div. of Manitowoc Shipbuilding, Inc. .....
Chemical Insecticide Corp. .....
Clover Chemical Co. .....
College Science Publishers .....
Collier Carbon & Chemical Corp. .....
Commercial Solvents Corp. .....
Consolidated Mining & Smelting Co. ....
Crown Zellerbach Corp. .....

Davison Chemical Co. .....
Deere, John, & Co. .....
Dempster Mill & Mfg. Co. .....
Diamond Alkali Co. .....
Dow Chemical Co. .....
E. I. du Pont de Nemours & Co., Inc. ...
Duval Sulphur & Potash Co. .....

Eastern States Petroleum & Chem. Corp... 19
Emulsol Chemical Corp. .....
Escambia Chemical Corporation .....

Flexo Products, Inc. .....
Food Machinery & Chemical Corp. .....
Frontier Chemical Co. 3

Gates Rubber Co. .....
Geigy Agric. Chemicals .....
Grace Chemical Co. .....
Grand River Chemical Div. of Deere & Co.

Hahn, Inc. .....
Hanson Equipment Co. .....
Harshaw Chemical Co. 20
Henderson Mfg. Co. .....
Hercules Powder Co. .....
Highway Equipment Co. 13
Hough, Frank G., Co. .....

Inland Chemical Corp. .....
International Minerals & Chemical Corp...

Johns-Manville Corp. .....
Jones, Robin, Phosphate Co. .....

Kalo Inoculant Co. .....
Kent, Percy, Bag Co. .....
Kraft Bag Corp. .....

McCall, Tom, and Associates, Inc. .....
Maas, A. R., Chemical Co. .....
Merck & Co. .....
Meredith Publishing Co. .....
Meyer, Wilson & Geo., & Co. 11
Mid-South Chemical Corp. .....
Miller Chem. & Fert. Corp. .....
Miller Publishing Co. 15
Mississippi River Chem. Corp. .....
Monsanto Chemical Co. .....

National Distillers & Chemical Corp. ....
National Potash Co. .....
Naugatuck Chemical Div., U. S. Rubber Co.
Niagara Chemical Division .....
Northern Peat Moss .....
Northwest Nitro-Chemicals, Ltd. .....

Olin Mathieson Chemical Corp. .....

Pacific Coast Borax Co. .....
Penick, S. B., & Co. .....
Pennsalt of Washington Div. of Pennsalt Chemical Corp. .....
Phillips Chemical Co., a subsidiary of Phillips Petroleum Co. .....
Potash Company of America .....
Power Curve Conveyor .....

Raymond Bag Co. .....
Roberts Chemicals, Inc. .....

Sackett, A. J., & Sons .....
Shattuck, S. W., Chemical Co. .....
Shell Chemical Corp. .....
Simonsen Mfg. Co. .....
Sinclair Chemicals, Inc. .....
Smith-Douglass Co., Inc. .....
Smith-Rowland Co., Inc. .....
Sohio Chemical Co. .....
Southern Nitrogen Co. .....
Southwest Potash Corp. .....
Spencer Chemical Co. .....
Spraying Systems Co. .....
Standard Oil Co. .....
Stepan Chemical Co. .....
Stewart-Warner Corp. .....
Successful Farming .....
Swift & Co. .....

Tennessee Corp. .....
Texas Gulf Sulphur Co. .....

Union Bag-Camp Paper Corp. .....
U. S. Borax & Chem. Corp. .....
U. S. Industrial Chemicals Co. .....
U. S. Phosphoric Products Division 4, 5
U. S. Potash Co. .....
U. S. Rubber Co., Naugatuck Chem. Div...
U. S. Steel Corp. .....

Velsicol Chemical Corp. .....

Wisconsin Eqpt. & Distr. Co. .....

What readers say about Croplife

"Croplife continually adds much to my knowledge of current events in the field of insect and weed control. Ideas found in 'Better Selling Section' are used by our salesmen and passed on to our dealers. The convenience you offer in bringing commercial leaflets to our attention and in making them easily available is very helpful."

PHILIP H. MARVIN
HO MAR AGRICULTURAL CHEMICALS
THE STEVE WISE CO., INC.
MANHATTAN, KANSAS
Distributors and Formulators

Editorial and advertising impact is measured . . . ultimately . . . in terms of individual readers. As the only weekly newspaper designed for the agricultural chemical industry Croplife provides an exclusive source of significant information for its readers, the pace-setters in this important field.

A unique circulation plan assures advertisers of an effective medium in both the manufacturing and marketing segments of the agricultural chemical industry. For complete information about how Croplife's coverage can be tailored to your needs, contact . . .

Croplife

2501 Wayzata Blvd.
Minneapolis, Minn.

EASTERN STATES OFFICE
551 Fifth Ave.
New York 17, N. Y.
MUrray Hill 2-2185

CENTRAL STATES OFFICE
141 West Jackson
Chicago 4, Ill.
HArrison 7-0515

SOUTHWESTERN STATES OFFICE
Board of Trade Bldg.
Kansas City 5, Mo.
Victor 2-1350

NORTHWESTERN STATES OFFICE
P. O. Box 67
Minneapolis 40, Minn
FRanklin 4-5200